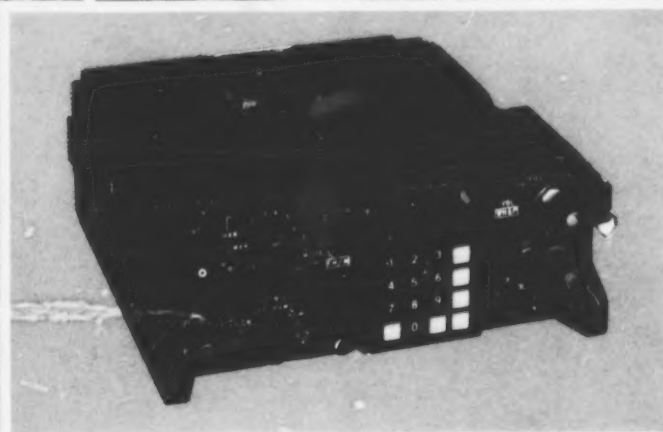
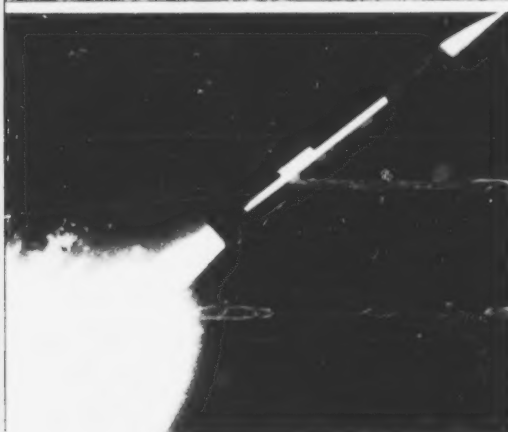


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**UNITED STATES ARMY
WEAPON SYSTEMS
1986**



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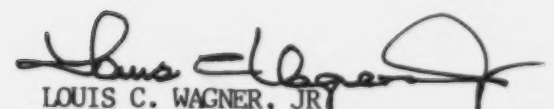
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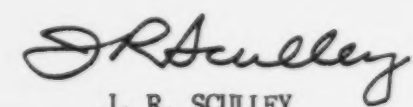
The US Army is in the midst of the largest peacetime modernization program in our nation's history. The M1/M1A1 Abrams tank, Bradley Fighting Vehicle System, Blackhawk Helicopter, Multiple Launch Rocket System, Stinger and Patriot Missile Systems, and other new items are now being fielded in sizeable numbers. The AH-64 Apache, the finest attack helicopter in the world, will be fielded this year. This vanguard of equipment gives our soldiers a remarkable qualitative advance in weapon system capability. The Army is also continuing dynamic product improvement programs to achieve as much growth potential as possible on older systems. Systems such as Chaparral, Hawk and TOW missiles, AH-1S Cobra, AHIP and CH-47D helicopters, Fire Support Team Vehicle (FISTV), M109 howitzers, I-81 mortars, and many other items are synergistic partners on the battlefield because of product improvements. A formidable, modernized conventional Force is a must. The Army represents the only large-scale, U.S. conventional capability—a key buffer between peace and theater nuclear war.

The Army is also maintaining its commitment to a strong Research and Development program. An innovative approach, focusing on Key Operational Capabilities, has been established to guide development between 1985 and 2000. We are leading off the handbook this year with a brief overview of Key Operational Capabilities and our technology base program.

Following the Research and Development section, the weapons systems and other equipment shown are categorized by specific Army mission areas as follows: Close Combat; Air Defense; Fire Support; Combat Support; Combat Service Support; Command, Control and Communications; Soldier Support; and the US Army Strategic Defense Command.

We are proud of the systems and programs portrayed in this handbook and trust that it will serve to provide you with a better understanding of how we are modernizing our Army.


LOUIS C. WAGNER, JR.
Lieutenant General, GS
Deputy Chief of Staff for Research,
Development, and Acquisition


J. R. SCULLEY
Assistant Secretary of the Army
(Research, Development and Acquisition)

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COMBAT SERVICE SUPPORT

COMMAND, CONTROL
AND COMMUNICATIONS

SOLDIER SUPPORT

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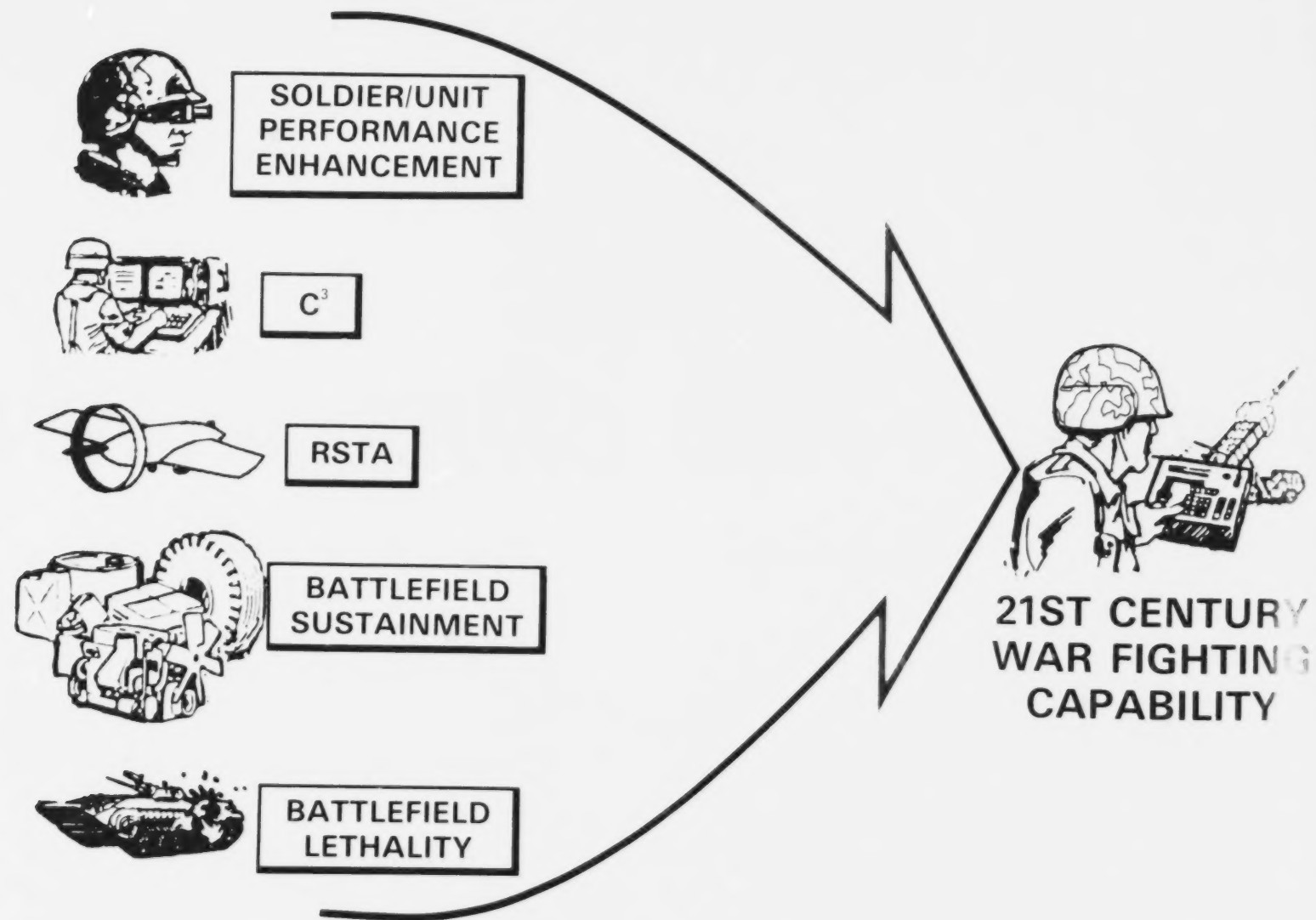
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RESEARCH AND DEVELOPMENT

KEY OPERATIONAL CAPABILITIES



RESEARCH AND DEVELOPMENT

This book highlights weapons systems and other equipment products of the Army Research, Development and Acquisition (RDA) program. These systems are the highly visible end products of the RDA process. Less visible are research and development efforts prerequisite to fielding Army systems and equipment.

KEY OPERATIONAL CAPABILITIES

Army Research and Development during the next 15 years will primarily address means to satisfy the five Key Operational Capabilities adopted by the Army Staff in February 1985. These Key Operational Capabilities are:

- o Soldier and Unit Performance Enhancement to maximize soldier combat capability and survivability; develop battlefield leaders; and increase unit productivity.
- o Command, Control and Communications (C³) to ensure continuity of C³ functions; maximize the combat effectiveness of personnel involved in C³ functions; and enable commanders to effect a favorable battle outcome.
- o Reconnaissance, Surveillance and Target Acquisition (RSTA) to field required battlefield intelligence capabilities in support of joint and combined operations; develop enhanced munitions-vectoring capabilities; and maximize the combat effectiveness of soldiers and units engaged in intelligence and electronic warfare operations on the battlefield.
- o Battlefield Sustainment to balance prepositioned war reserve stocks; protect and optimize the use of critical industrial base resources; encourage expansion of the industrial facilities necessary to support wartime surge; maximize the productivity of logistics support to units; and provide efficient battlefield casualty management to optimize the return of soldiers to duty.
- o Battlefield Lethality to field the requisite deep operations capability; develop anti-armor leap ahead for close combat; achieve the capability to neutralize or suppress enemy indirect fire systems and air defense weapons; ensure survivability of forces; provide required offensive electronic warfare capability for engaged forces; and develop a survivable and logistically supportable light helicopter family.

Cutting across each of the five Key Operational Capabilities is the requirement to consider the concept of lightness: Eliminating unneeded volume and weight to improve agility, mobility, and effectiveness. Moreover, the Army must be able to fight and sustain the battle as part of joint and combined forces. Therefore, the Army will continue to sponsor joint initiatives through joint force development processes; joint development of doctrine; standardization of operational definitions and terminology; and joint and combined training. Achieving these Key Operational Capabilities will enable the Army to enhance significantly its warfighting capability.

TECHNOLOGY INTEGRATION



TECHNOLOGY INTEGRATION

The technology base program supports the development of future generations of weapon systems by performing the concept definition, concept formulation and technology maturation necessary for technology integration. A strong technology base is needed to: establish and maintain technological superiority in military weapons, thus offsetting adverse numerical advantages; avoid technological surprise that could cause premature obsolescence of major weapons systems; assure timely acquisition of combat effective systems using innovative products built on new technology; enhance personnel effectiveness; and reduce combat casualties.

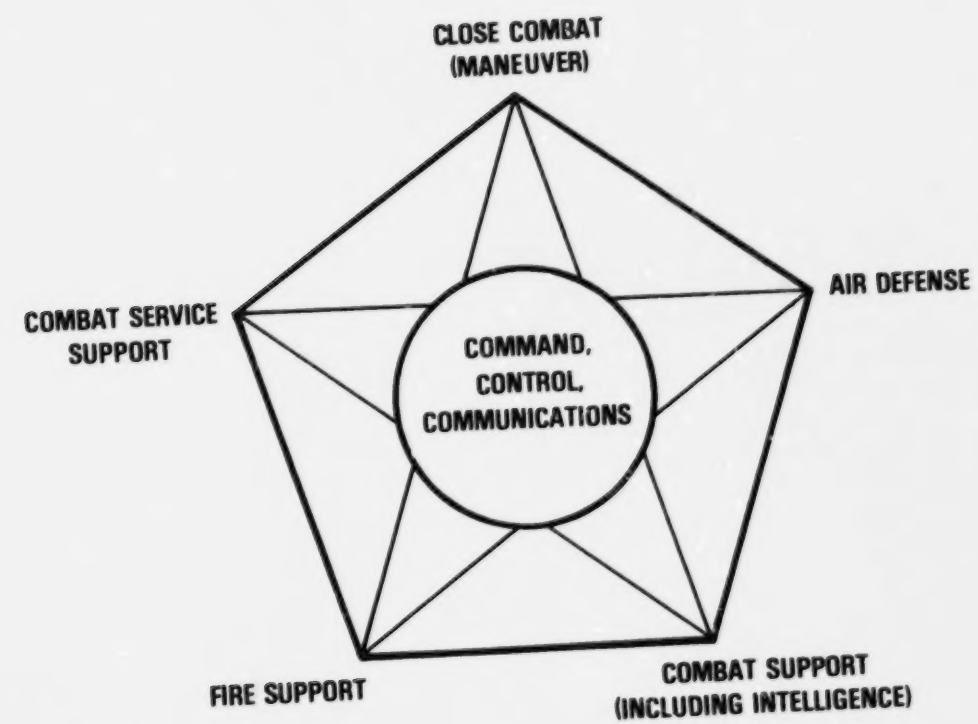
This strong technology base can only be achieved through the exploitation of technologies that provide a significant or revolutionary increase over current capabilities. The following is a list of selected high-leverage technologies currently being pursued by the technology base program in support of the Key Operational Capabilities.

- o Very Intelligent Surveillance and Target Acquisition (VISTA) to provide improved, near real-time, ground and airborne sensor fusion.
- o Distributed Command, Control, Communications and Intelligence (DC³I) to enhance communications and distribution of information to all levels of command.
- o Self-Contained Munitions that after launch can acquire, select and guide a warhead to a hostile target. These munitions utilize advances in fiber-optics, infrared, electro-optical, and radar technologies. Improved fuzes, warheads and delivery systems are also included.
- o AirLand Battlefield Environment tactical decision aids will provide information on terrain, weather, and battlefield-induced contaminants and intelligence regarding the effectiveness of friendly or threat weapons systems and operations.
- o Soldier-Machine Interface technologies to reduce training and improve operations capabilities. This area will be emphasized in all technology thrust efforts.
- o Biotechnology is being explored to yield new vaccines, antidotes, chemical and biological detection systems, and other means of preventing illness and reducing the effect of injury.
- o Computer-Aided Reliability Design, Manufacturing and Inspection to produce lighter weight combat vehicles that enhance mobility and require less logistic support.

These technologies, coupled with new organizational and operational concepts, will be evaluated in a series of demonstrations. Great benefits will be derived from the integration of technology, personnel, and operational concepts.

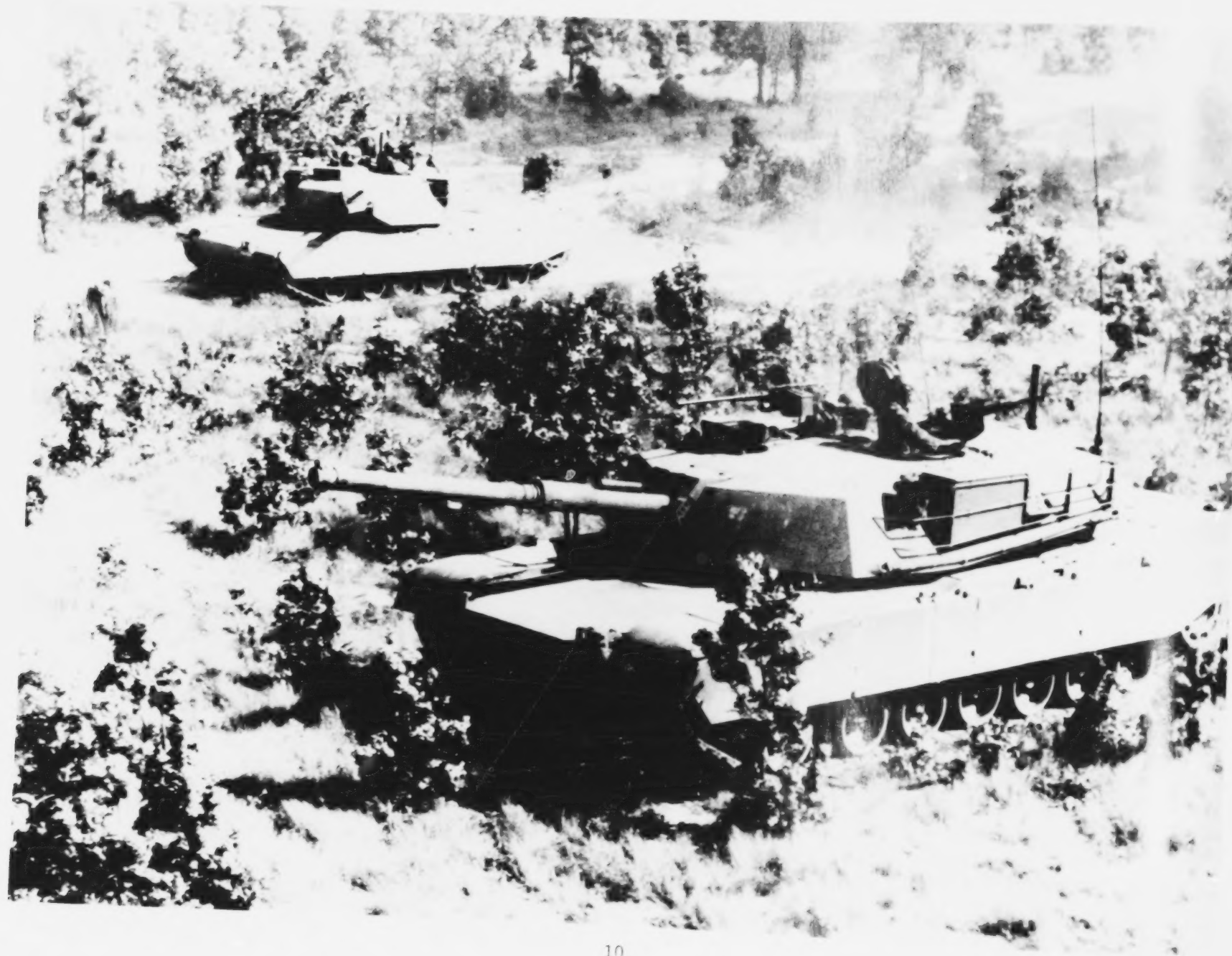
The weapon systems described on the following pages are categorized by mission areas beginning with close combat. A brief explanation of the vital contribution of each mission area begins each section.

It must be emphasized that these mission areas—the weapon systems and soldiers who operate them—work inextricably together on the battlefield. That is the essence of the combined arms concept and the belief that a numerically small, but high quality Army, working in a fully synchronized manner, will be able to hold its own against one with superior numbers. For this reason, our Research, Development and Acquisition planning is linked early and continuously with doctrine, training and force structure requirements to permit a coordinated advance across all these mission areas. In short, we strive for a balanced Army. There must be no weak links in the equipment we provide our soldiers. The logo on the opposite page is an attempt to show how mission area teamwork and a balanced equipment posture is crucial to victory on the battlefield.



The Close Combat mission area relates to the application of direct combat power. As the term indicates, close combat involves two adversaries standing eyeball to eyeball, with man pitted against man, weapon against weapon. This mission area includes such items as tanks, fighting vehicle systems, direct line-of-sight weapons, and short-range mortars that are used by the infantryman.

CLOSE COMBAT



M1/M1A1 ABRAMS TANK

MISSION:

The Abrams Tank is the Army's primary ground combat weapon system for closing with and destroying enemy forces using firepower, mobility and shock action. This is accomplished in coordination with other ground and air systems under all battlefield conditions and levels of combat intensity. The Abrams special armor, compartmentalization of fuel and main gun ammunition which is stored away from the crew, together with an automatic fire detection and suppression system make it less vulnerable and more survivable on the modern battlefield. Its improved day-night fire control and shoot-on-the-move capability assure its ability to deliver highly accurate and lethal fires on both armored and unprotected targets. The 1500-horsepower turbine engine and improved suspension system permit the tank to move quickly across the battlefield, while reducing the tank's exposure to threat weapons.

CHARACTERISTICS:

	M1	M1A1	M1 and M1A1
Length:	384.5 inches	387.0 inches	Secondary Armament: One .50 cal machinegun
Width:	143.8 inches	Same	Armament: Two 7.62mm machineguns
Height:	93.5 inches	Same	Power Train: 1500 hp gas turbine engine w/4 speed automatic transmission
Weight:	60.0 tons	63 tons	Cruising Range: 275 miles at 29 mph
Top Speed:	45 mph	41.5 mph	Fire Control: Thermal Imaging Sight; Laser Rangefinder; Digital Computer
Crew:	4	Same	
Main Gun:	105mm	120mm	

SOVIET COUNTERPART:

Over the past decade the Soviets have conducted an intensive armor modernization effort and have fielded several thousand T-64's and T-72's with enhanced armor protection and firepower. In addition, they are fielding the new T-80 tank which will probably be capable of launching an ATGM (Anti-tank Guided Missile) through the main gun tube.

PROGRAM STATUS:

The M1 is now in its sixth year of procurement with over 3000 produced at the end of FY 1985. Fielding began in 1981 and will continue into the early 1990's. Twenty-three battalions were fielded at the end of FY 1985. Deliveries of the 120mm-gun-equipped M1A1 with NBC overpressure protective system began in August 1985. The Army is also pursuing a product improvement program to assure the Abrams maintains its competitive position through the 1980's and beyond. M1 performance in the field has been impressive and has been conclusively demonstrated by M1 battalions on four REFORGER exercises in Europe.

CONTRACTORS:

General Dynamics, Land Systems Division (Detroit, MI)	Cadillac Gage (Detroit, MI)
GMC, Detroit Diesel Allison Div (Indianapolis, IN)	Honeywell Inc. (Hopkins, MN)
Hughes Aircraft Corp. (Culver City, CA)	Kollmorgen (Northampton, MA)
AVCO Lycoming Division (Stratford, CT)	Singer-Kearfott (Little Falls, NJ)
Garrett Airesearch (Torrance, CA)	Firestone (Akron, OH)



M60A3 TANK

MISSION:

The M60A3 is a product improved version of the Army's M60 series tank, which has been in the field since 1961. Important improvements made to the M60A1 tank in the A3 upgrade program include gun stabilization, laser rangefinder, and solid-state computer and thermal shroud, which have enhanced the first-round hit capability. Further, the fighting capability of the M60A3 is significantly improved with the addition of a tank thermal imaging sight which extends capabilities during periods of reduced visibility. The M60A3 is replacing M60A1 tanks in both Europe and the United States.

CHARACTERISTICS:

Length:	371.5 inches	Secondary Armament:	One .50 cal and one 7.62mm machinegun
Width:	144 inches	Power Train:	12-cyl, 750 hp air-cooled diesel engine with 2 speed automatic transmission
Height:	129 inches	Cruising Range:	280 miles @ 20 mph
Weight:	57.3 tons	Fire Control	Tank Thermal Sight; Laser Rangefinder; Analog Ballistics Computer
Top Speed:	30 mph		
Crew:	4		
Main Gun:	105mm		

SOVIET COUNTERPART:

The T-62 medium tank was produced about the same time that the M60 family was fielded. The T-64 and T-72 possess better armor protection and a more capable gun than the M60A3, however they would be considered inferior in night vision capability and fire control.

PROGRAM STATUS:

New production of M60A3 tanks was completed in 1983 with 1686 tanks produced. Currently emphasis is being placed on converting M60A1 tanks in the inventory to M60A3 tank configuration. Conversions are being accomplished at Anniston and Mainz Army Depots.

CONTRACTORS:

General Dynamics (Warren, MI)	Texas Instruments (Dallas, TX)
Teledyne Continental Motors (Muskegon, MI)	Baird Atomic (Bedford, MA)
GMC, Detroit Diesel Allison Div. (Indianapolis, IN)	Cadillac Gage (Warren, MI)
Blaw-Knox Corp (East Chicago, In; Wheeling, WV)	Bendix Corp. (Eatontown, NJ)
Honeywell Inc. (Hopkins, MN)	Goodyear (Akron, OH)
Firestone (Akron, OH)	Kollsman Instr. Co. (Nashua, NH)
Optic Electronics Corp. (Dallas, TX)	



BRADLEY FIGHTING VEHICLE SYSTEMS (BFVS)
INFANTRY FIGHTING VEHICLE (IFV) AND CAVALRY FIGHTING VEHICLE (CFV)

MISSION:

The Bradley Fighting Vehicles provide the mechanized infantry with a full-track, lightly armored fighting vehicle, and scout and armored cavalry units a vehicle for their screening, reconnaissance, and security missions. Both IFV and CFV have a two-man turret which mounts the 25mm automatic stabilized cannon, its primary armament, supported by the TOW antitank guided missile system, and the 7.62mm coaxial machinegun. The IFV has, in addition, six 5.56mm firing port weapons positioned along the side and rear of the vehicle. The overall mobility of the vehicle is comparable to that of the M1 tank. The IFV carries a nine-man squad—commander, gunner, driver, and six squad members. A major modification, which incorporates the more lethal TOW II missile system into the vehicles, is in procurement and is scheduled for fielding in 1987. These modified vehicles have been designated M2A1 and M3A1.

CHARACTERISTICS:

Weight:	50,000 lbs (Combat)	Crew:	3
Length:	21.5 ft	Power Train:	500 hp Diesel
Height:	9.75 ft	Cruising Range:	300 miles
Width:	10.5 ft	Road Speed:	42 mph
Main Armament:	25mm Cannon	Swim Speed:	4.5 mph
Secondary Armament:	TOW, 7.62mm Coaxial MG, Firing port weapons (IFV Only)		

SOVIET COUNTERPART:

The Soviet BMP has been in the field in quantity for well over a decade and is considered an excellent infantry fighting vehicle. It mounts a 73mm smoothbore cannon, an AT3, AT4, or AT5 antitank guided missile a SAGGER antitank missile, and permits the infantry squad to fire from the inside. A variant with a 30mm gun, the BMP-2, has also been seen.

PROGRAM STATUS:

Bradley production has built up to a rate in excess of 50 vehicles per month and vehicle fielding is proceeding smoothly. To date the 2d Armored Division, and 1st Cavalry Division, Fort Hood, Texas, the 3d Infantry Division and the 11th Armored Cavalry Regiment in Germany, and two National Guard Battalions have been equipped with Bradley Fighting Vehicles.

CONTRACTORS:

FMC Corp. (San Jose, CA)	Ford Aerospace (Newport Beach, CA)
General Electric Corp. (Pittsfield, MA)	Honeywell (Minneapolis, MN)
Cummins (Columbus, IN)	RCA (Burlington, MA)
Colt Industries (Hartford, CT)	Chrysler Corp. (Huntsville, AL)
Hughes Aircraft Co. (El Segundo, CA)	Hughes Helicopter, Inc. (Culver City, CA)



M113A3 ARMORED PERSONNEL CARRIER

MISSION:

The M113A3 is a product improved, aluminum armored, full-tracked personnel carrier designed to transport troops, equipment, and cargo during combat operations. The A3 configuration adds spall suppression liners, armored external fuel tanks, an upgraded engine and transmission to accommodate the added weight, and fixing points for bolt-on armor. It operates in numerous roles including: Infantry and Engineer Squad Carrier, Mortar Carrier, Missile Carrier, Command Post, MED-EVAC Carrier, Maintenance Support Vehicle, and other special roles. The M113 carrier fleet will continue to be improved for service in these capacities beyond the year 2000. Because of its mobility, firepower, and armor protection limitations, it cannot fulfill the role of a fighting vehicle and is being replaced in squad carriers and scout vehicle roles of high priority mechanized infantry and cavalry units by the Bradley Fighting Vehicles.

CHARACTERISTICS:

Weight:	27,200 lbs	Armament:	50 Cal. Machinegun
Armor:	Aluminum	Horsepower:	275
Road Speed:	45 mph	Troop Capacity:	11
Cross-Country:	20 mph		

SOVIET COUNTERPART:

The Soviet wheeled BTR-60, BTR-70, and new BTR-80 series amphibious armored personnel carriers are roughly equivalent in function to the M113. The MTLB amphibious, multipurpose, tracked carrier is used to carry infantry and as a prime mover for towed artillery and antitank guns.

PROGRAM STATUS:

Deliveries of the new M113A3 production will begin 4th quarter FY86. A modification program is now underway to implement the Congressionally directed survivability improvement upgrades to the existing M113A2s. These vehicles will be redesignated the M113A3. Applique armor is being developed and will be available for application to selected carriers in the fleet by FY88.

CONTRACTORS:

FMC Corp. (San Jose, CA)
 GMC, Detroit Diesel Allison (Detroit, MI)
 GMC, Detroit Diesel Allison (Indianapolis, IN)



AH-64 APACHE

MISSION:

The Apache is a quick-reacting, airborne antitank weapon. Terrain limitations and the unfavorable balance in armor dictate the need for a system that can fly quickly to the heaviest enemy penetration and destroy, disrupt, or delay the attack long enough for friendly armor and ground units to reach the scene. The Apache is designed to fight worldwide and survive. It is equipped with a Target Acquisition Designation Sight and Pilot Night Vision Sensor (TADS/PNVS) which permit its two-man crew to navigate and attack in darkness and in adverse weather conditions. Although the principal mission of the Apache is the destruction of enemy armor with the Hellfire missile, it is also equipped with a 30mm chain gun and Hydra 70 rockets that are lethal against a wide variety of targets. When deployed, the Apache will be the Army's primary attack helicopter. The Apache begins deployment in FY86 and will be complemented by the Cobra that is now in the field.

CHARACTERISTICS:

Mission Weight:	14,660 lbs
Speed:	146 knots
Crew:	2
Armament:	Hellfire Missiles, Hydra 70 rockets and 30mm chain gun

SOVIET COUNTERPART:

The Soviets have deployed significant numbers of HIND attack helicopters. This helicopter is capable of delivering antitank guided missiles, anti-aircraft missiles, unguided rockets, Gatling gun fire, (cannon fire on some) and bombs. While the HIND is faster than the Apache, it is considered less maneuverable, probably more vulnerable, and less capable of accurate antiarmor fire in darkness and adverse weather. The HIND is more capable than the presently fielded US Cobra. The Soviets are also expected to deploy 2 new attack helicopters very similar to the Apache, in the near future.

PROGRAM STATUS:

Apache is in production: The first forty-five have been delivered to the Army. Production contracts for 309 aircraft are on-going. The current total program will procure 675 AH-64s.

CONTRACTORS:

McDonnell Douglas Helicopters (Mesa, AZ)
General Electric (W. Lynn, MA)
Martin Marietta (Orlando, FL)



HELLFIRE MODULAR MISSILE SYSTEM

MISSION:

Hellfire is a third-generation airborne antiarmor weapon. It is presently intended for use as the main armament of the Apache helicopter. Hellfire homes on laser energy projected from ground observers, other aircraft or the launching aircraft itself. This enables the Apache AH-64 to launch its missiles indirectly, in some situations without seeing its target. The Apache AH-64 can carry up to 16 Hellfire missiles. Uses on other Army and US Marine Corps aircraft are also under consideration for Hellfire. Hellfire provides improvement over TOW: (1) greater lethality, (2) increased firing rates, (3) greater standoff range, (4) greater versatility, and (5) less time of flight.

CHARACTERISTICS:

Diameter: 7 inches
Weight: 99 lbs
Guidance: Laser semi-active

SOVIET COUNTERPART:

The Soviets have a wide variety of antiarmor missiles of varying accuracy and lethality. No accurate comparison is yet possible between Hellfire and a possible Soviet laser homing antitank weapon.

PROGRAM STATUS:

Hellfire has entered full production and will be first fielded with the Apache in 1986.

CONTRACTORS:

Rockwell International Corporation (Duluth, GA)
Martin Marietta (Orlando, FL)



AH-1S COBRA

MISSION:

The AH-1, which saw extensive combat in Vietnam, is a single engine, two place, attack helicopter. In its original "G" configuration it was an excellent weapon against enemy personnel and lightly armored vehicles, but had no capability against tanks. The Tube Launched Optically Tracked Wire-Guided (TOW) missile was mated with the AH-1 to produce the TOW/Cobra, or AH-1S. The AH-1S began service in 1977, and today the fully modernized version is operational in Europe and Korea. The Cobra, while an effective weapon system, is limited in performance and largely limited to fair weather. In addition, the TOW missile is wire guided, and the launching aircraft must keep the target in its sights until missile impact, tending to expose the aircraft to enemy missile and gun fires. These and other performance, lethality, and survivability considerations led the Army to begin the AH-64, Apache program. The Cobra, however, will remain in service in a complementary role long after the fielding of the Apache. The Cobra's primary mission is to destroy armor vehicles, but it is also equipped with the Hydra 70 multipurpose submunition rockets and 20mm cannon which are effective against other targets.

CHARACTERISTICS:

Mission Weight:	10,000 lbs
Speed:	129 knots
Crew:	2
Armament:	TOW missiles, Hydra 70 rockets and 20mm cannon.

SOVIET COUNTERPART:

The Soviet HIND-D/E attack helicopters hold a considerable advantage over the Cobra in terms of ordnance capacity, cargo capacity, armor protection, and speed. The Soviets are also expected to deploy two new attack helicopters in the near future.

PROGRAM STATUS:

The Army plans to provide its Cobras with night firing capability and will continue to convert remaining AH-1G models to the AH-1S configuration. The Cobra Fleet Life Extension Program (C-FLEX) incorporates numerous life extension modifications including rotor improvements, blue-green cockpit lighting, improved TOW and TOW test set reliability, and upgraded radios.

CONTRACTORS:

Bell Helicopter Textron (Ft. Worth, TX)
Lycoming (Stratford, CT)
Hughes Aircraft Co. (Culver City, CA)



ARMY HELICOPTER IMPROVEMENT PROGRAM (AHIP)

MISSION:

AHIP provides commanders with a survivable, real time combat information, command and control, reconnaissance, security, aerial observation, and target acquisition/designation system to operate with attack helicopter, air cavalry and field artillery units during day, night, and reduced visibility conditions. The AHIP is a program to modify OH-58A observation helicopters with a Mast-Mounted Sight (MMS) capable of operating in day/night and limited visibility conditions. The AHIP provides commanders with a highly mobile, survivable, and responsive means to find the enemy, keep the enemy under surveillance, perform reconnaissance forward and along flanks, secure lightly contested areas, acquire and designate critical targets, and provide command and control of attack helicopter teams and artillery fires. The AHIP will operate in air cavalry, attack helicopter, and field artillery units. The MMS enhances survivability by allowing the aeroscout crew to accomplish their mission while hovering behind trees and hilltops. It provides target acquisition and laser designation at stand-off ranges for Hellfire, Copperhead, and other Army and Air Force Laser-guided munitions. Aircraft performance also provides an acceptable hot-day, high-altitude Nap-of-the-Earth and flight maneuver capability for worldwide employment.

CHARACTERISTICS:

Mission Weight:	4,225 lbs
Speed:	120 knots
Crew:	2

SOVIET COUNTERPART:

The Soviets and Poles are believed to be working on new light weight helicopters, but they are not expected to have a role similar to AHIP.

PROGRAM STATUS:

The AHIP program is in production.

CONTRACTORS:

Bell Helicopter Textron (Ft. Worth, TX)
McDonnell Douglas (Huntington Beach, CA)
Northrop (Anaheim, CA)
Sperry Flight Systems (Albuquerque, NM)
Allison Gas Turbine Operations, G1 (Indianapolis, IN)

LHX ARTIST'S CONCEPT



LHX (LIGHT HELICOPTER FAMILY)

MISSION:

The Light Helicopter (LHX) family will be the Army's next generation rotorcraft and will be designed to meet the requirements of the Air Land Battle and Army 21. The current Army fleet of Vietnam vintage AH-1, UH-1, OH-58, and OH-6 helicopters, nearly 30 years old by the mid-nineties, is becoming increasingly expensive to maintain and is not capable of fully performing its required mission in many parts of the world today. The LHX will be a lightweight (8000 +/- 500 lb) highly reliable and easily maintained weapons system that will achieve a high degree of standardization and reduced support costs. It will be developed around two basic configurations, a scout/attack version (SCAT) and a utility. Both models will share common engine and dynamic components as well as a fully integrated/automated cockpit arrangement. Technology maturing in the 1980's will be the cornerstone of the LHX design.

CHARACTERISTICS:

Weight:	8000 lbs (+/- 500 lbs) (SCAT Version)
Speed:	180 + knots
Endurance:	2.5 - 3 hours
Crew:	Single Pilot (Goal)
Armament:	4 Hellfire Missiles, 2 Stinger Missiles, and a Gun Provision (Primary Mission Gun)

SOVIET COUNTERPART:

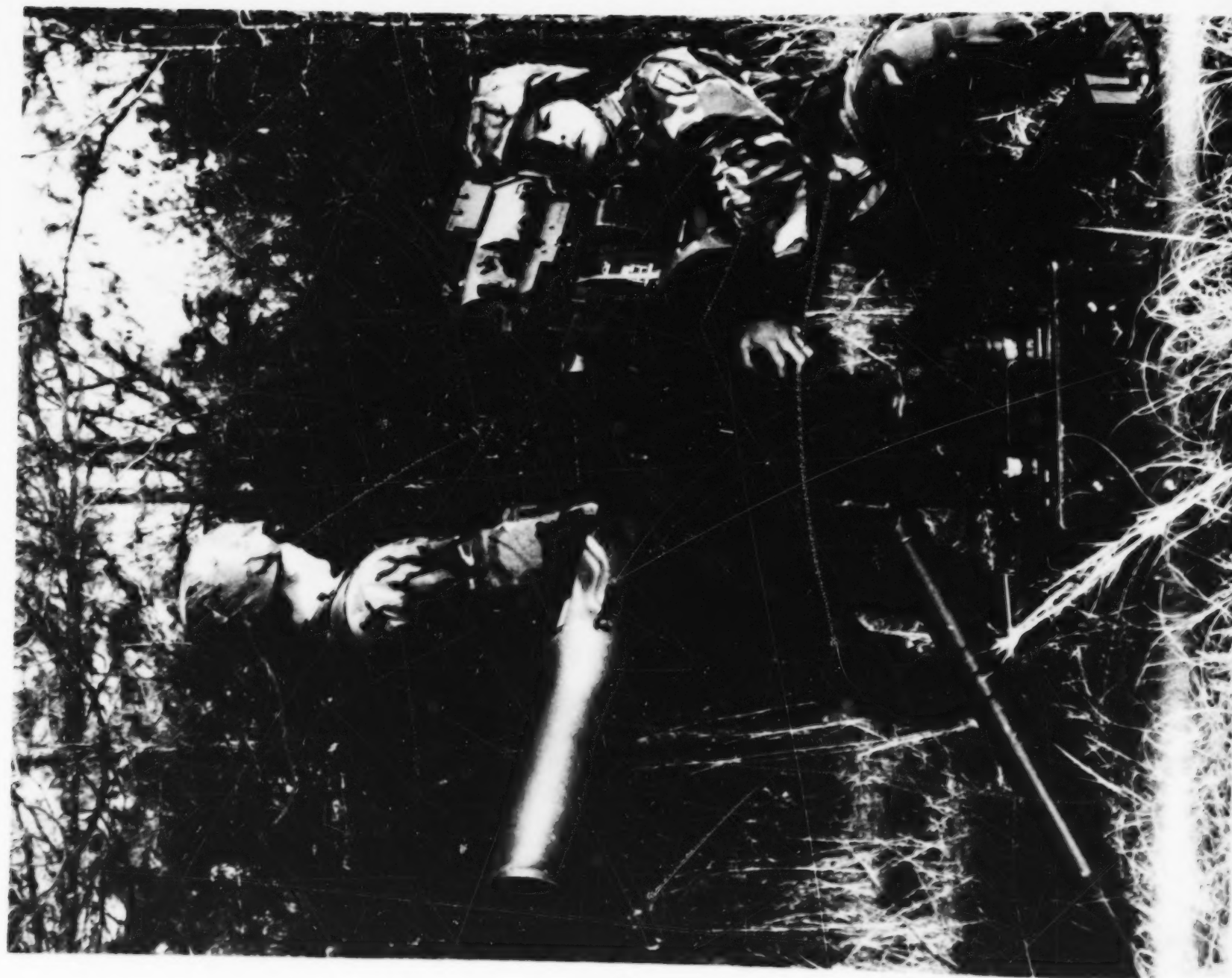
None, although both the Soviets and Poles are believed to be working on a new Light Helicopter.

PROGRAM STATUS:

LHX is currently in validation/demonstration proceeding toward a Milestone I/II decision in mid 1986. Full scale development for LHX will begin in 1987 and the system will be introduced into the field in the early 1990's. The T-800 Engine development began in July 1985.

CONTRACTORS:

Preliminary Design contracts with Bell, Boeing Vertol, McDonnell Douglas Helicopters and Sikorsky. Advanced Rotorcraft Technology Integration contracts for an Integrated/automated cockpit design with IBM, Bell, Boeing, McDonnell Douglas Helicopters and Sikorsky.



TOW MISSILE SYSTEM

MISSION:

The TOW (Tube-Launched, Optically Tracked, Wire Command-Link, Guided) missile is the most powerful antitank weapon used by the infantry. It is found at battalion level in ground units and is also mounted on the Bradley Fighting Vehicle, Improved TOW Vehicle, the High Mobility Multipurpose Wheeled Vehicle (HMMWV) and on the AH-1S Cobra Helicopter. When the missile is fired, a sensor in the launcher tracks a flare in the tail of the missile. The gunner need only keep his crosshairs on the target. A computer in the launcher corrects any deviation of the missile from the crosshair aim point and sends corrections to the missile via two extremely thin wires that deploy in flight. The warhead is powerful enough to frontally penetrate the majority of presently fielded main battle tanks.

CHARACTERISTICS:

Weight (Ground Launcher): 246 lbs
Weight (Missile-cased): 62.4 lbs
Range: 3750 meters
Crew: 4

SOVIET COUNTERPART:

The Soviets have fielded a family of semiautomatic, command to line of sight, anti-tank guided missiles similar to the TOW. The AT-4/SPIGOT is a crew served system with a maximum range of 2000 meters. AT-5/SPANDREL is the vehicular mounted version with a larger missile and a maximum range of 4000 meters. AT-6/SPIRAL is the heliborne ATGM mounted on the HIND-E and has a range of 5000 meters.

PROGRAM STATUS:

Basic TOW has been in the inventory for a number of years. A TOW Thermal Night Sight and an improved warhead-ITOW have been fielded. Production of the new TOW 2 missiles and modification kits to convert Basic launchers to the TOW 2 configuration is in progress. Deliveries of these missiles and launcher modification kits began in early 1983. Initial Operational Capability was met in October 1983 in Europe. TOW is now fielded in Europe, Korea, Panama and selected CONUS units. There is an aggressive product improvement program that will ensure TOW weapon system effectiveness into the 1990s.

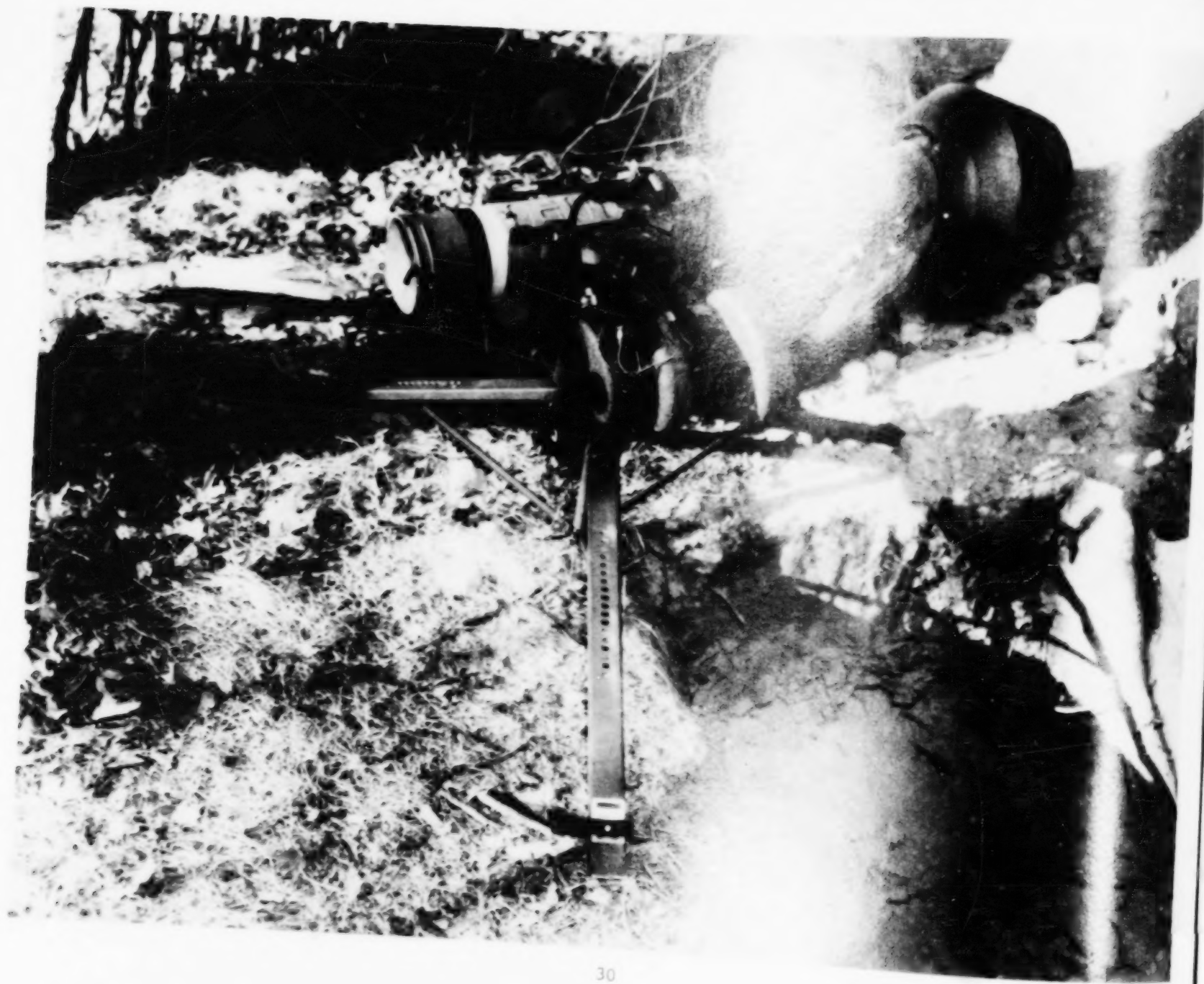
CONTRACTORS:

Hughes Aircraft (Canoga Park, CA)
(El Segundo, CA)
(Long Beach, CA)
(Tucson, AZ)

Texas Instruments (Lubbock, TX)
(Dallas, TX)
(Abilene, TX)

Emerson Electric (St. Louis, MO)

Sun Chemical Co. (New York, NY)
Kollsman Div (Nashua, NH)
(Merrimac, NY)



DRAGON

MISSION:

Dragon is a medium-range, wire-guided antitank missile that replaced the 90mm recoilless rifle. It is designed to provide an accurate manportable antitank capability at platoon level. A Dragon gunner need only keep his sight crosshairs on the target to score a hit. An electronic mechanism in the launcher tracks an infrared flare in the tail of the missile and keeps it aligned with the gunner's line of sight via commands sent along two thin wires. Course corrections are made by tiny thrusters in the body of the missile.

CHARACTERISTICS:

Weight (Tracker):	6.5 lbs
Weight (Missile):	24.4 lbs
Range:	1000 Meters
Crew:	1

SOVIET COUNTERPART:

The Soviets have fielded a shoulder fired ATGM (AT-7) which is comparable to the Dragon.

PROGRAM STATUS:

Dragon is deployed in Army units and is out of production. Some of the missile inventory is suffering from a short shelf life of the rocket thrusters which are being upgraded. The United States Marine Corps (USMC) is about to develop a "maxi-PIP" product improvement to include warhead upgrade, guidance and missile improvements. The Army plans to adopt the USMC warhead product improvements.

CONTRACTORS:

Raytheon (Bristol, TN)
McDonnell Douglas (Titusville, FL)
Texas Instruments (Austin, TX)
Kollsman Instruments (Nashua, NH)



SQUAD AUTOMATIC WEAPON (M249)

MISSION:

The Squad Automatic Weapon provides a lightweight, one-man-portable, base of fire for infantry squads. This role was filled during World War II and Korea by the Browning Automatic Rifle, during the 1960's by the M14A1 Rifle, and during the 1970's by the M16A1 Rifle. For this role, the M16A1 was equipped with a bipod and fired in the automatic mode. There are two and three M249's in Army and Marine Corps Infantry squads, respectively. Acquisition is also expected by the Air Force and Navy. Modifications are being made to the weapon to enhance soldier-weapon interface.

CHARACTERISTICS:

Caliber:	5.56mm
Weight:	14.3 lbs
Rate of Fire:	700 rds/min
Range:	800 meters
Magazine Capacity:	200 rds

SOVIET COUNTERPART:

The closest Soviet equivalent systems are the 7.62mm PKM and the 5.45mm RPK 74 which are fielded with Soviet and Warsaw Pact nations.

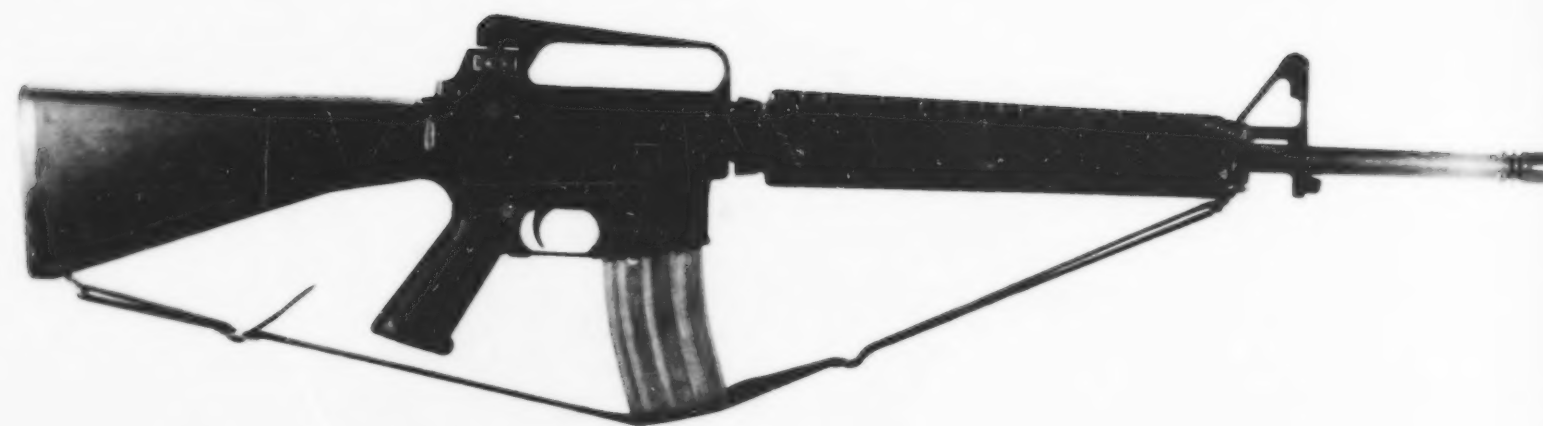
	<u>PKM</u>	<u>RPK 74</u>
Caliber:	7.62mm	5.45mm
Weight:	18.5 lbs	11 lbs
Rate of Fire:	650 rds/min	600 rds/min
Range:	1000 meters	800 meters
Magazine Capacity:	100 rds	75 rds

PROGRAM STATUS:

The M249 was type-classified in February 1982. Fielding started in FY84.

CONTRACTOR:

Fabrique Nationale (Herstal, Belgium) was contractor for FY82 and FY83 procurements. Competitive CONUS procurement will begin with a contract award in August 1987.



M16 (5.56mm) Rifle

M16A2 RIFLE

MISSION:

The M16A2 is an improved version of the M16A1 and will be issued to front line combat soldiers as the Army's primary combat rifle. The M16A2 is a lightweight, air-cooled, gas operated, low impulse rifle. It incorporates improvements in sight, pistol grip, stock and overall combat effectiveness. A current Army effort will enhance the combat effectiveness of the rifle by modifying the upper receiver to accept day optical and night sights. The improvement will be on all M16A2's which the Army buys. Accuracy is improved by incorporating an improved muzzle compensator, three round burst control, a heavier barrel and by using the heavier NATO standard ammunition.

CHARACTERISTICS:

Caliber:	5.56mm
Weight:	8.9 lbs
Range:	550 meters
Type of fire:	Semi-automatic, three round burst
Magazine capacity:	30 rounds

SOVIET COUNTERPART:

The 7.62mm AK-47 has been the standard rifle of the Soviet Army since 1957 and is now the standard weapon for the Soviet Navy and Air Force ground troops.

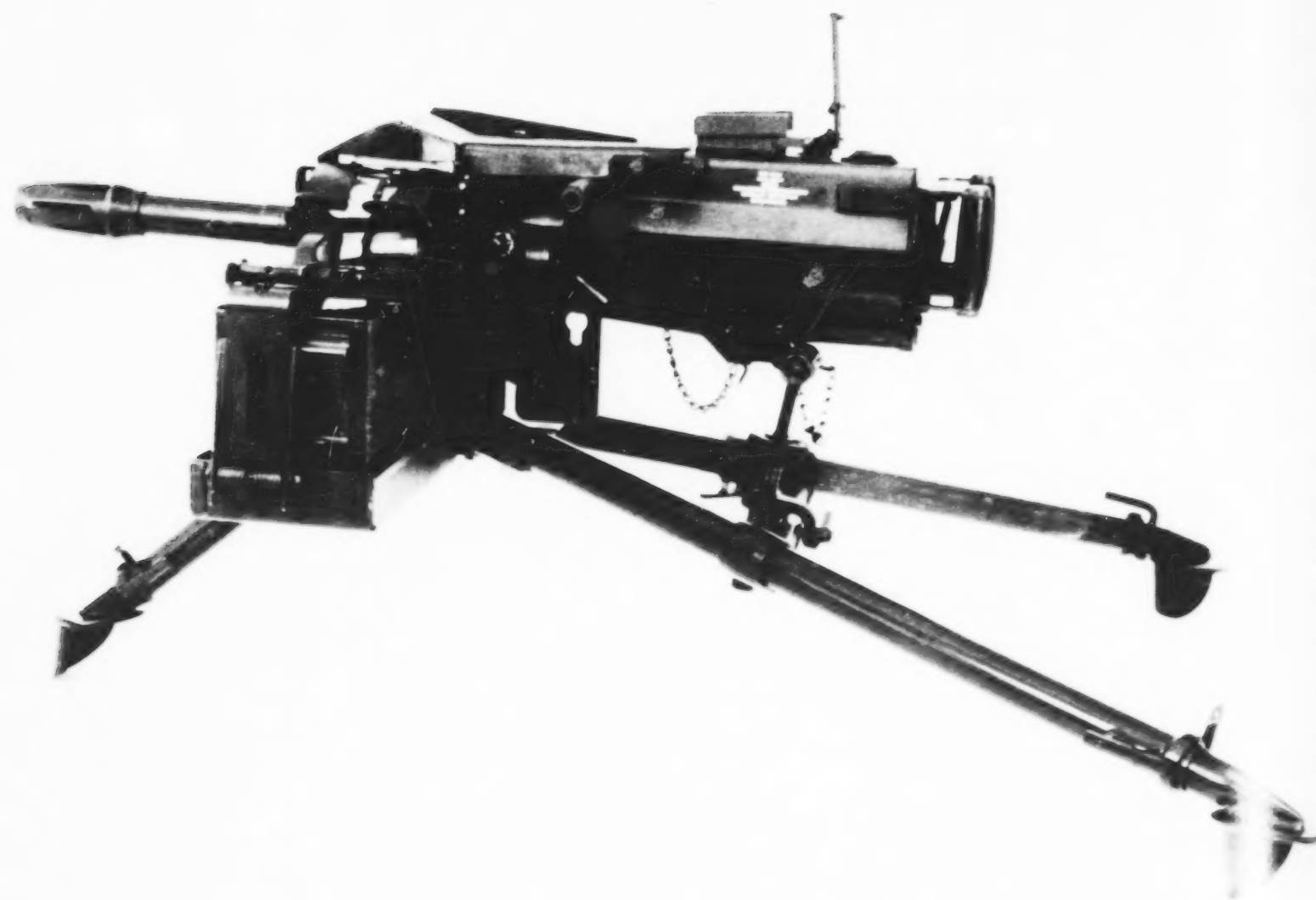
Caliber:	7.62mm
Weight:	9.5 lbs
Range:	30 meters
Type of fire:	Semi and full automatic
Magazine capacity:	30 rounds

PROGRAM STATUS:

The M16A2 is in production with initial deliveries to the Army scheduled for August 1986.

CONTRACTOR:

Colt Industries (Hartford, CT)



MK19-3 40MM AUTOMATIC GRENADE LAUNCHER

MISSION:

The MK19-3 will be used in offensive and defensive operations against personnel and light-armored vehicles. It will be used in the main battle area by all types of infantry units and by combat support and combat service support units to conduct rear area security missions. The MK19-3 will be mounted on M151 1/4 ton trucks, M113 Armored Personnel Carriers and High Mobility Multi-Purpose Wheeled Vehicles (HMMWV).

CHARACTERISTICS:

Caliber:	40mm
Weight:	76 lbs
Rate of fire:	325-375 rds/min
Max effective range:	1600 meters
Lethality:	Anti-personnel - 5 meters (Expected Casualty Radius) Anti-armor - 2.0 inches penetration to maximum range of 2200M

SOVIET COUNTERPART:

The Soviet 30-mm AGS-17 automatic grenade launcher is basically an improved version of the US 40mm MK19 Mod 0 machine gun, which saw extensive service in Vietnam.

Caliber:	30mm
Weight:	37 lbs
Rate of fire:	250-300 rds/min
Max effective range:	1200 meters

PROGRAM STATUS:

The MK19-3 was developed and approved for service use by the Navy in 1981. The Army type classified the M19-3 as standard "A" in December 1985. Initial procurement of MK19-3 for the 9th Infantry Division was contracted for by the Navy in October 1983 with delivery starting in second quarter FY85.

CONTRACTOR:

SACO Defense Systems Division of Maremont Corporation (Saco, Maine).



BERETTA 92 SB, 9MM

M9 9MM PERSONAL DEFENSE WEAPON

MISSION:

The 9mm pistol is the standard replacement weapon for the caliber M1911A1 .45 caliber pistol and various caliber .38 revolvers currently used by the Department of Defense. The 9mm is a semiautomatic double-action pistol that is more lethal, lighter, and safer than the .45 caliber pistol. It can be used effectively by either right or left handed shooters. The weapon will be issued to individual who are not riflemen, or who are not issued rifles for personal defense, for law enforcement personnel, close quarter requirements, and aviators. The 9mm pistol is a Joint Service Program. It will result in a standardized weapon capable of firing NATO standard 9mm ammunition.

CHARACTERISTICS:

Caliber:	9mm
Weight (Loaded):	2.6 lbs (fully loaded)
Range (Meters):	50-100m
Trigger action:	Double
Magazine capacity:	15 rounds

SOVIET COUNTERPART:

The 9mm Makarov is the standard pistol for the Soviet forces and for most of the countries in the Warsaw Pact. It is a copy of the Walther PP in general size, shape and handling.

Caliber:	9mm
Weight:	1.8 lbs
Range:	50 meters
Trigger action:	Double
Magazine capacity:	8 rounds

DPROGRAM STATUS:

The 9mm Personal Defense Weapon is being procured for the Joint Services. An initial five year, multiyear firm fixed price contract was awarded in April 1985 for 315,930 weapons. Deliveries are scheduled to begin during the Third Quarter FY86.

CONTRACTOR:

Beretta, USA. (Accokeek, MD)



120MM TANK MAIN GUN AMMUNITION

MISSION:

The 120mm family of tank ammunition will support the 120mm main gun on the M1A1 Tank. The 120mm munitions are currently comprised of four cartridges - a kinetic energy Armor Piercing Fin Stabilized Discarding Sabot (APFSDS) round, a chemical energy High Explosive Anti-Tank (HEAT) round and training counterparts for each. This development program represents a successful effort to transfer the Leopard II cannon and munitions technology and integrate it into our M1 Abrams tank system. The fielding of the 120mm tank weapons system will complement the current fleet of 105mm M1 and M60 series tanks and provide a significant increase in the Army's armor combat capability.

CHARACTERISTICS:

Armor Piercing Fin Stabilized Sabot (APFSDS) - Combustible cartridge case; one piece depleted uranium penetrator.

High Explosive Anti-Tank (HEAT) - Combustible cartridge case; multi-action fuzing; shape charge warhead.

Target Practice Cone Stabilized Discarding Sabot - Combustible cartridge case; limited range; cone stabilized; training counterpart for APFSDS.

Target Practice - Combustible cartridge case; inert warhead; training counterpart for HEAT.

SOVIET COUNTERPART:

The Soviet armor forces have available armor piercing fin stabilized, high explosive antitank, and high explosive fragmentation munitions.

PROGRAM STATUS:

The technology transfer program was initiated in 1979. License agreement requirements to enable U.S. production of the 120mm munitions were completed in 1982. All cartridges have been approved for production. The initial production contract was awarded in January 1984. Availability of the entire family of 120mm ammunition is scheduled to coincide with the deliveries of the first production model of the M1A1 in 1985/86.

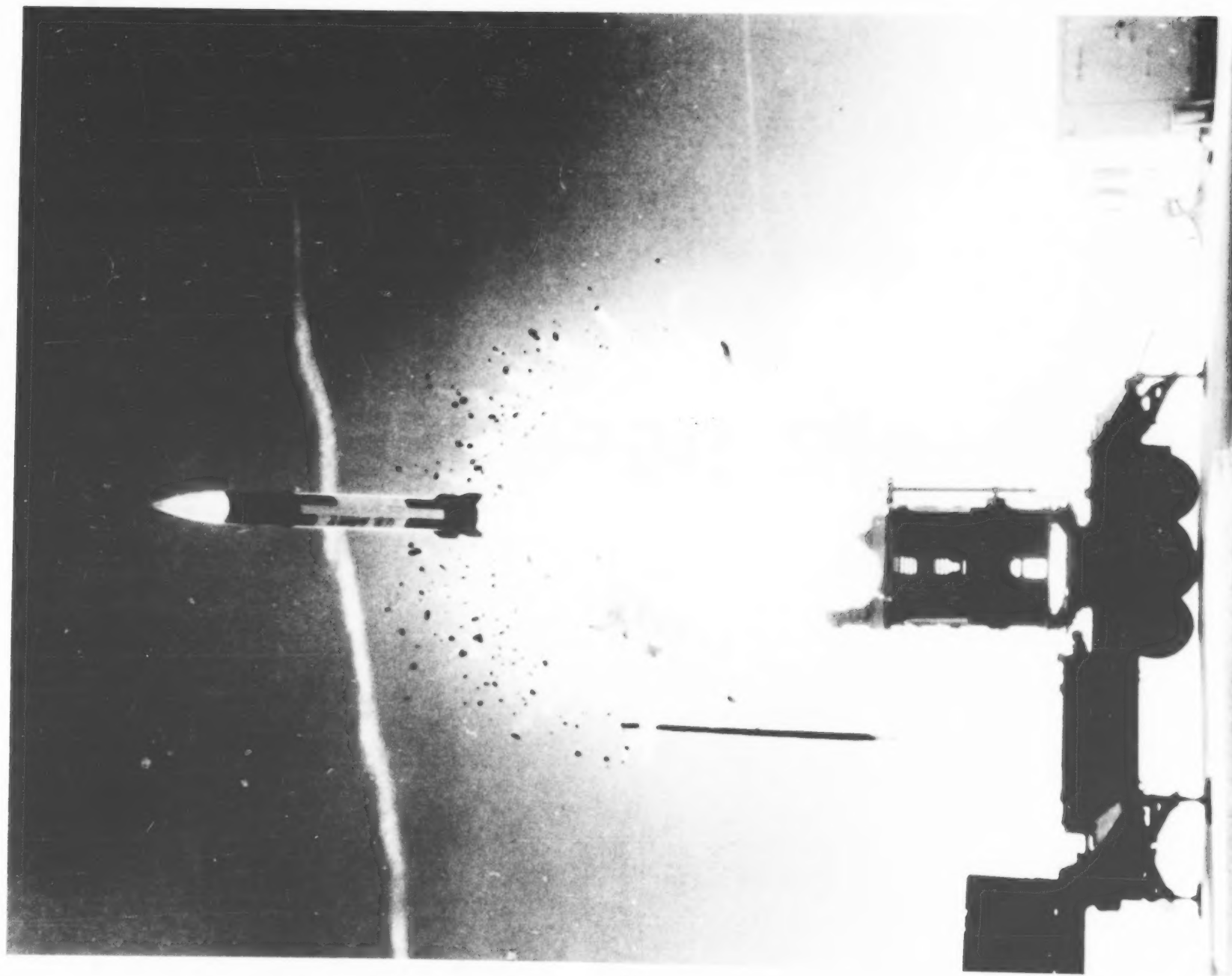
CONTRACTORS:

Honeywell, Inc. (Minnetonka, MN)
Aerojet Industries (Jonesboro TN)
General Defense Corp. (Red Lion, PA)
Chamberlain Mfg. (Waterloo, IA)
Norris Industries (Vernon Beach, CA)

Flinchbaugh Products (Red Lion, PA)
ARMTEC Defense Products (Coachella, CA)
Bulova Systems (Valley Stream, NY)
Hercules (Radford, VA)
Mason and Hanger (Middletown, IA)

The Air Defense mission area relates to the detection and engagement of the air threat with ground fire systems. Air defense systems must protect all ground forces elements including troop formations, depots, lines of communication, air bases, key command and control facilities, and other vital assets.

AIR DEFENSE



PATRIOT

MISSION:

Patriot, the Army's new all altitude missile system, will be the centerpiece of theater air defense. The system's fast reaction capability, high firepower, and ability to operate in a severe electronic countermeasure environment are features not previously available in Nike Hercules and Hawk, the systems Patriot will replace. The Patriot design eases the field logistic burden since its overall performance is achieved with less equipment, less operational manpower and fewer repair parts than current systems. The combat element of the system is the fire unit which consists of a radar set, an engagement control station, a power plant, and up to eight remotely located launchers. The system is highly automated combining high-speed digital processing with various software routines to effectively control the battlespace. The single radar, using phased array technology, provides for all tactical functions of airspace surveillance, target detection and track, and support of missile guidance. The only manned element of the fire unit during an air battle, the engagement control station, provides the human interface for control of automated operations. Each launcher contains four ready-to-fire missiles, sealed in canisters, which serve a dual purpose as shipping containers and launch tubes.

CHARACTERISTICS:

Guidance: Track-Via-Missile
Engagement: Multiple Targets Simultaneously

SOVIET COUNTERPART:

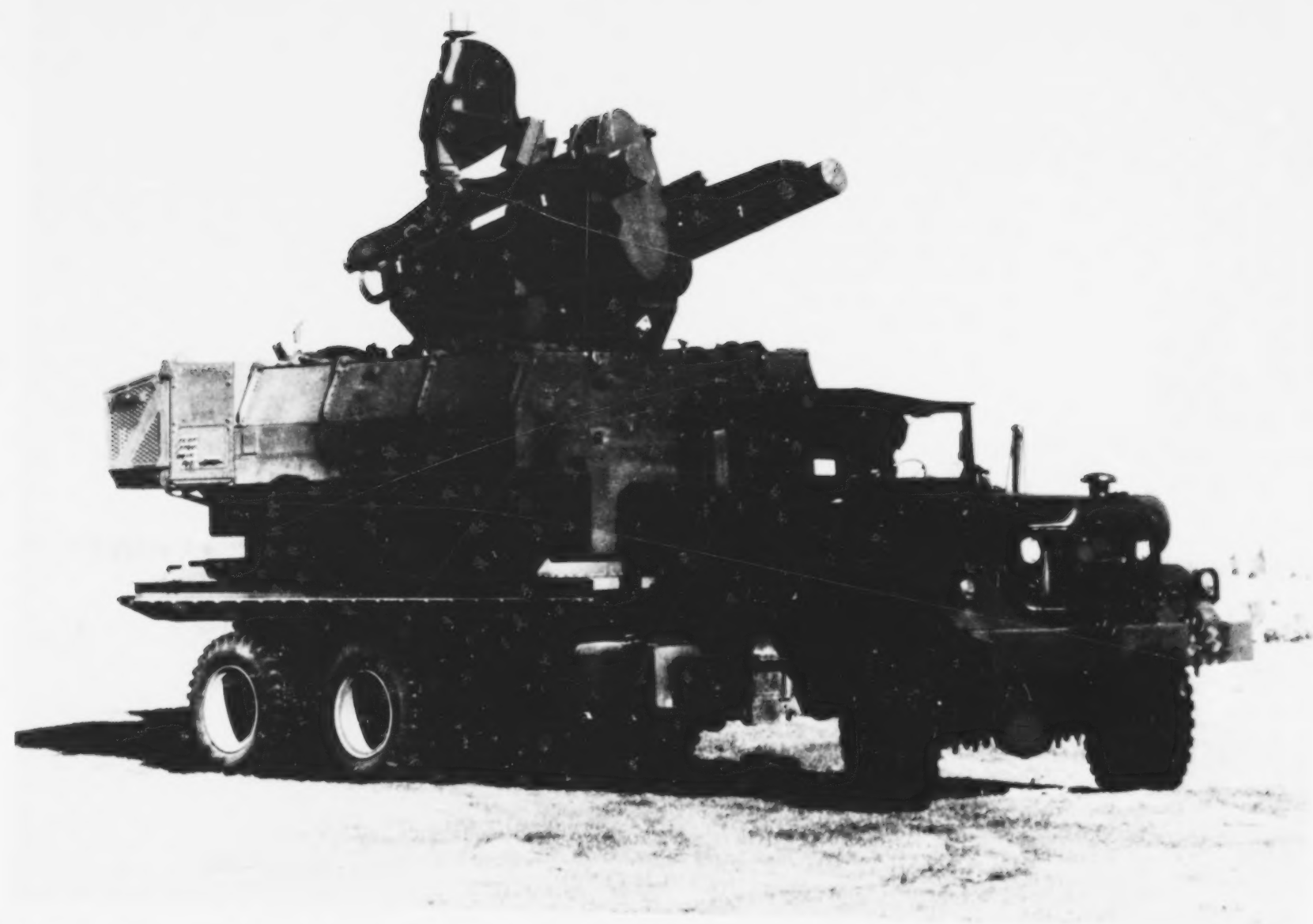
The Soviets have several missile systems, including the SA-1, SA-2, SA-4, SA-5 and SA-10 that are used to attack aircraft in the regime for which Patriot was designed. Only the SA-10 is considered as advanced or effective as Patriot, but the SA-X-12 (the SA-4 replacement) will soon add another Patriot counterpart system.

PROGRAM STATUS:

Patriot is in its seventh year of production and was initially deployed to Europe in 1985. Two battalions are currently operational with four additional battalions scheduled to join our forces during the next two years. The Army is currently working with several NATO nations and Japan on Patriot acquisition programs to provide for cooperative air defense improvements. The first NATO unit will be delivered in 1986.

CONTRACTORS:

Raytheon Company (Bedford, MA)
Martin Marietta Corporation (Orlando, FL)



ROLAND

MISSION:

The Soviets have fielded an enormous number of high-performance aircraft and helicopters over the past several years. Many of them, such as the MIG-23, are designed for bombing and missile attack of ground units. In addition, the trend is toward aircraft that can attack in darkness and bad weather. The US Army currently has no all-weather, short-range, air defense missile system. Roland, a European designed, highly mobile, all-weather, short-range system adapted for use by the Army, is radar guided (with an optical backup capability) and mounted entirely on one wheeled vehicle. A single fire unit can track and destroy up to ten enemy aircraft in a matter of minutes. Roland will be used in support of the Rapid Deployment Force.

CHARACTERISTICS:

Crew: 4
Guidance: Radar/Optical
Missiles: 10 per vehicle

SOVIET COUNTERPART:

The Soviet SA-8 system, fielded in the mid-70's, is mounted on a large wheeled vehicle. It is also designed for all-weather operations and is roughly equivalent to Roland, although it has greater range capability. All components needed to conduct the engagement (acquisition, tracking, and guidance radars, and missiles) are mounted on a three-axle amphibious vehicle.

PROGRAM STATUS:

Production has been completed on the U.S. Roland. The program is structured to field a single battalion which is located at McGregor Range NM, and manned by New Mexico Army National Guard personnel.

CONTRACTORS:

Hughes Aircraft Company (Canoga Park, CA)
Boeing Aerospace Company (Seattle, WA)



HAWK

MISSION:

HAWK is a medium-range air defense guided missile system designed to provide air defense coverage against low to medium altitude air attack. In the field since 1960, it is a mobile all weather, day and night missile system providing vital air defense against enemy air attack. HAWK has superior fire control, lethality, range, reliability, and effectiveness in an electronic countermeasures environment. In the Basic HAWK configuration, over a score of high performance aircraft were destroyed in the Middle East War of 1973. Currently, HAWK is being reorganized into a more streamlined and efficient fighting organization. Each platoon contains a Platoon Command Post which controls the platoon's equipment and fights the airbattle; an acquisition and a tracking radar; an optical tracking system; an IFF (Identification Friend or Foe) system; and 3 to 4 launchers containing 9 to 12 ready missiles. The HAWK missile carries a large proximity fusing, high-explosive warhead which needs only pass near the target to destroy it.

SOVIET COUNTERPART:

The Soviet SA-6 is somewhat similar to HAWK. Its range and altitude capabilities (30 km and 10 km, respectively) are less than that of the HAWK, but the SA-6 is more mobile. The basic SA-6 unit is a regiment which includes five missile firing batteries. Principal components of a missile battery include a target acquisition and fire control radar called "STRAIGHT FLUSH" and 4 Transportation Erector Launchers (TEL's). Each TEL carries 3 ready-to-fire missiles.

PROGRAM STATUS:

HAWK received its first major product improvement in FY73 and is deployed worldwide with the Army, Marines, NATO, and numerous other friendly nations. HAWK modernization is continuing through a series of product improvements that enhance firepower, readiness, serviceability and combat proficiency against the projected threat.

CONTRACTORS:

Raytheon Company (West Andover, MA)
Areoject (Sacramento, CA)
Westinghouse Electric Corp (Baltimore, MD)
Northrop Corp (Anaheim, CA)
ICSD (Hauppauge, NY)



CHAPARRAL

MISSION:

Chaparral is the Army's short-range air defense (SHORAD) surface-to-air missile system. It is effective against all types of aircraft at low altitudes and provides protection for forward deployed divisions and corps and theater rear areas. Chaparral is a self-contained, self-propelled system. Its tracked carrier provides excellent cross-country mobility. The launch station is self-contained and can be removed from the carrier and be ground emplaced. The missile is lightweight, supersonic, fire-and-forget, with an all aspect passive infrared homing guidance system capable of engaging both approaching and receding targets. To reduce rocket motor smoke, a smokeless motor has been developed and is being retrofitted to inventory missiles upon shelf-life expiration of the current "smoky" motors. To assist the gunner in identifying targets as friendly, Chaparral has an Identification Friend-or-Foe (IFF) subsystem. Chaparral carries four ready missiles on launch rails and eight additional missiles in storage compartments. Chaparral was initially fielded in 1969 and will remain in the inventory through the 1990's.

CHARACTERISTICS:

Crew: Five
Guidance: Infrared Homing, Fire and Forget
Warhead: Blast-fragmentation
Fuze: R^r directional doppler

SOVIET COUNTERPART:

The SA-9 and SA-13, introduced in late 1960's and 1970's respectively, are the counterparts to Chaparral. They have approximately the same range and also use an infrared homing guidance system. The SA-9 and SA-13 provide regimental-level air defense; there are 16 weapon systems per division (four per regiment) with 4 missiles per vehicle. The SA-9 is mounted on a two-axle amphibious vehicle; the SA-13 is on an MTLB tracked vehicle.

PROGRAM STATUS:

To keep Chaparral current, several improvements are programmed. It is presently constrained to clear-day operations because targets are visually acquired. A Forward-Looking Infrared (FLIR) Night Sight—a target acquisition device—has been developed and entered production in FY82. The FLIR provides the gunner day, night and some adverse weather target acquisition capability. Development was initiated in FY82 to provide Chaparral with an improved missile guidance system to provide enhanced capability against infrared countermeasures. The improved missile, which will incorporate a Rosette Scan Seeker (RSS), will significantly improve target acquisition and engagement range capability. Chaparral was provided to the New Mexico Army National Guard beginning in FY84. A towed version of Chaparral has been developed for the light forces.

CONTRACTOR:

Ford Aerospace and Communications Corp. (Newport Beach, CA)



STINGER

MISSION:

Stinger is a shoulder-fired, infrared homing missile system whose mission is to provide air defense coverage to even the smallest of combat units. The missile homes on the heat emitted by either jet or propeller-driven fixed-wing aircraft or helicopters, and employs a proportional navigation system that allows it to fly an intercept course to the target. A Stinger crew visually acquires its target and electronically interrogates it to determine if it is a friend. The missile notifies the gunner when it has a "lock" on the target. It is then fired from the tube by a small launch motor. Once the missile has traveled a safe distance from the gunner, its main engine ignites and propels it to the target. Stinger is stored in a sealed tube, requires no maintenance in the field, and is designed to withstand the rigors of the battlefield. It is replacing the Redeye system. It can attack much faster targets than Redeye, and most importantly, can destroy aircraft from any angle. A follow-on seeker (Stinger-POST) improves the capability of the system in certain infrared countermeasures environments. Stinger-Reprogrammable Microprocessor (RMP) further enhances the performance in infrared countermeasures environments and provides the capability to make future changes as the threat evolves through a replaceable software mode.

SOVIET COUNTERPART:

Soviet Manportable Air Defense Systems are the SA-7, comparable to the US Redeye, and the SA-14. The SA-7 was a range and altitude capability of approximately 3 km and only a tail chase capability. The SA-7 was used extensively in Vietnam and the Middle East and is deployed with the maneuver units throughout the Warsaw Pact. The SA-14, fielded in the late 1970's, has similar performance characteristics to the Stinger. The SA-14 is replacing the SA-7.

PROGRAM STATUS:

Stinger is in production and was operationally deployed to Germany in 1981 and to the 82nd Airborne Division in 1982. Stinger-POST entered production in FY83. These missiles are scheduled to be deployed in FY87. Stinger-RMP entered development in September 1984. Missiles being delivered beginning in July 1987 will be RMP configured.

CONTRACTORS:

General Dynamics (Pomona, CA)
Teledyne Electronics (Newbury Park, CA)

The Fire Support mission area includes those systems directly related to the generation of indirect firepower. This mission area includes not only conventional, nuclear, and chemical fire support provided by cannons, rockets, and missile systems, but also the target acquisition and communication systems integral to field artillery operations.

FIRE SUPPORT



PERSHING II MISSILE SYSTEM

MISSION:

Pershing II is a modular, evolutionary improvement to the previously fielded Pershing IA ballistic missile. It is more accurate than the PLA and provides more than twice the range (1800 km). The accuracy improvement is achieved by a technique called Radar Area Correlation. As the Pershing II reentry vehicle descends in the area of the target, it compares live radar reflection from the target area with reference scenes stored prior to launch. It then makes course adjustments based on the comparisons, producing almost pinpoint accuracy, and hence allowing the use of smaller nuclear warheads that produce less unwanted collateral damage. Pershing II also incorporates several other features that enhance its flexibility and decrease its operating costs. Pershing II is part of an appropriate response to the Soviet deployment of the SS-20, a system that threatens virtually all installations and cities in western Europe. The Pershing system is truck mounted, highly mobile, and rapid reacting, and as such is a survivable and powerful part of the tactical nuclear force in Europe.

CHARACTERISTICS:

Propulsion: Solid two-stage
Warhead: Nuclear

SOVIET COUNTERPART:

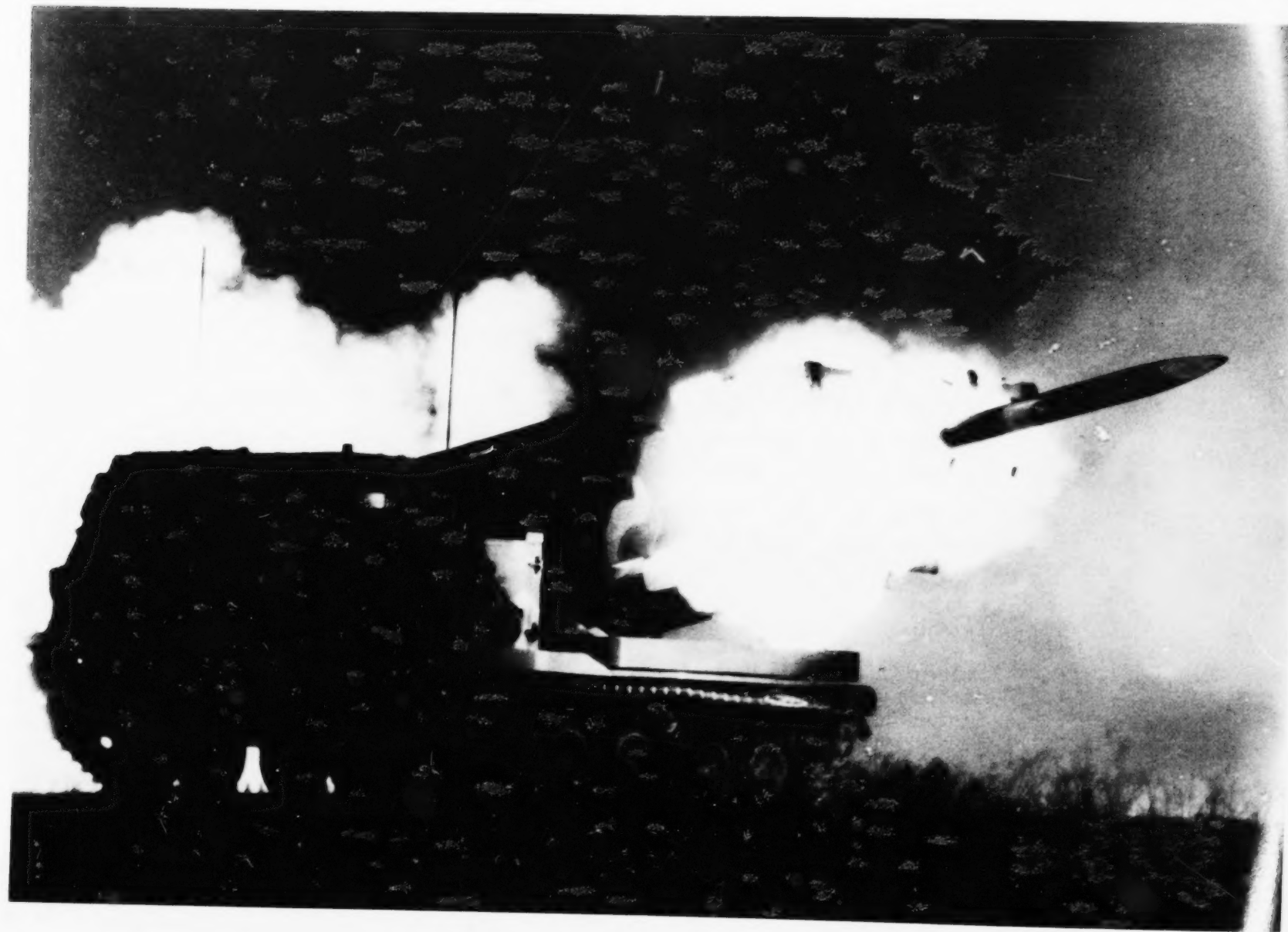
The SS-20, a mobile intermediate-range ballistic missile (IRBM). It is configured to carry three MIRV's and has a range of close to 5000 km. It does not, however, have the accuracy afforded by the Pershing II system Radar Area Correlation Guidance.

PROGRAM STATUS:

Pershing II is in full-scale production and began deployment in December 1983.

CONTRACTOR:

Martin Marietta (Orlando, FL)
Goodyear Aerospace Corp. (Akron, OH)
Singer Co., Kearfott Division (Little Falls, NJ)
Bendix Corp. (Teterboro, NJ)
Hercules Inc. (Salt Lake City, UT)



MULTIPLE LAUNCH ROCKET SYSTEM (MLRS)

MISSION:

The MLRS is a free-flight, area fire, artillery rocket system being developed to fill an existing void in conventional fire support. The primary missions of MLRS are counterfire and suppression of enemy air defenses. MLRS supplements cannon artillery fires by delivering large volumes of firepower in a short time against critical, time-sensitive targets. The basic warhead carries improved conventional submunitions. Germany, one of five partners in an international development program, is developing a scatterable mine warhead. Growth potential exists to add a Terminal Guidance Warhead (TCW)—to defeat armor—and a binary chemical warhead. Codevelopment of TCW by the United States, United Kingdom, Germany, and France began in Fiscal Year 1985 and will continue in Fiscal Year 1986. The Army Tactical Missile System, when fielded, will use the MLRS as its launch platform.

CHARACTERISTICS:

Warhead: Improved Conventional Munitions (ICM)
Propulsion: Solid

SOVIET COUNTERPART:

The Soviets have a very effective multiple rocket capability with several sizes of rockets. The rockets themselves, however, are not believed to be as effective as the MLRS rocket. A new system, believed to be similar in employment concept and size, has been seen deployed in Europe. A Soviet MRL will not have the degree of automation or flexibility of operations of the US MLRS.

PROGRAM STATUS:

MLRS has completed its design maturation phase and is approved for full-scale production. It was developed on an accelerated schedule followed by initial fielding in March 1983. The Army awarded a multiyear contract in September 1983 for procurement of MLRS for US forces. MLRS will be coproduced by the United States, United Kingdom, Germany, France, and Italy.

CONTRACTORS:

LTV Aerospace and Defense (Dallas, TX)
Atlantic Research (Camden, AR)
Norris Industries (Los Angeles, CA)

Norden Systems (Norwalk, CT)
Brunswick Corp (Camden, AR)
Bendix Corp (Redbank, NJ)



M109A2/A3 SELF-PROPELLED HOWITZER/HOWITZER IMPROVEMENT

MISSION:

The M109A2 is an improved version of the M109 self-propelled howitzer that was fielded in the early 1960's. The M109A3 is a depot modified M109A1 with the same performance capabilities as the production M109A2. The M109 is designed to provide the primary indirect fire support to the maneuver brigades of the armor and mechanized infantry divisions. The M109A2/A3 is air transportable in a C5 and is capable of firing both conventional and nuclear munitions. The Army, in October 1985, initiated the development of a major system modification of this fielded system. The modification includes: automotive improvements, crew Nuclear/Chemical/Biological (NBC) protection and dual fire suppression system, driver's night-vision device, communications, ballistic computer and navigation system and built-in test equipment. These improvements will provide significant improvements in system responsiveness, survivability and lethality.

CHARACTERISTICS:

	M109A2/A3	Improved M109A2/A3
Range:	24km w/Rocket Assisted Projectile 18.1km unassisted	30 km or greater
Weight:	55,000 lbs (Combat loaded)	Max 60,000 lbs
Length:	29.9 ft	Same
Height:	10.8 ft	Same
Width:	10.3 ft	Same
Main Armament:	155mm cannon (M185)	Improved 155mm cannon
Secondary Armament:	Machine Gun Cal. .50 and M16A1 rifles	Same
Crew:	6 (Accompanying Vehicle M548/3)	Same
Cruising Range:	220 miles (345km)	TBD
Ammunition:	All ammunition except the M203 charge	All ammunitions

SOVIET COUNTERPART:

The Soviets have a modern 152mm self-propelled howitzer designated 2S3. It is considered comparable to the M109A2 in most performance characteristics.

PROGRAM STATUS:

The M109A2 is in full-scale production. Final delivery is in 1987.

CONTRACTOR:

Bowen-McLaughlin-York, a Division of Harsco Corporation (York, PA)



M198 155MM MEDIUM TOWED HOWITZER

MISSION:

The M198 is being employed in the active Army and reserve components in the direct support field artillery battalions of the infantry divisions and separate brigades and in corps battalions supporting the airborne and air assault divisions. It is also being employed by the US Marines in their divisions. It replaces the World War II-vintage 155mm towed howitzer. The M198 provides major increases in range and reliability over its predecessor howitzers. It may be parachute delivered or carried by a variety of cargo aircraft or medium helicopters.

CHARACTERISTICS:

Range:	30.5 km with rocket-assisted projectiles, 18.1 km unassisted
Weight:	15,750 lbs
Length:	40.3 ft (Towed Configuration)
Height:	9.5 ft (Towed Configuration)
Width:	8.3 ft
Crew:	11
Ammunition:	Standard 155mm ammunition, nuclear ammunition, and the new family of 155mm ammunition (cannon-launched, guided projectiles, scatterable mines and improved munitions).

SOVIET COUNTERPART:

The Soviet towed D20, 152mm howitzer is the rough equivalent of the M198 in most performance characteristics. It is considered an excellent and reliable weapon.

PROGRAM STATUS:

The M198 had its last funded procurement in FY82. There is no procurement in FY84 through FY86; however, procurement is planned in FY87 through FY89.

CONTRACTORS:

Carriage:	Consolidated Diesel Electric Corp. (Waterburg, CT)
Fire Control:	Numax Electronics (Hauppauge, NY)
	OPTO Machanik (Melbourne, FL)
	ALUF Industries (Corona, NY)
	Ruoff & Sons, Inc. (Runnemede, NJ)
	Action Mfg. Co. (Philadelphia, PA)
	Action Mfg. Co. (Waconia, MN)



XM119 105MM HOWITZER

MISSION:

The XM119 is a non-developmental 105mm light howitzer from the United Kingdom. It will replace the M102 and the M101A1 howitzers in the Army's inventory. The XM119 will provide fire support for the six light Infantry Divisions and other Rapid Deployment Forces. This weapon affords the commander the improved range and performance needed to maintain his maneuverability and quick strike capability. It will fire all of the conventional 105mm ammunition in the inventory plus several new enhanced capability rounds now under development. It is air mobile with the UH-60 helicopter and its prime mover will be the High Mobility Multipurpose Wheeled Vehicle (HMMWV).

CHARACTERISTICS:

Range (kilometers):	16.8 DPICM, 14.3 HE, 19.5 Rocket Assisted Projectile (RAP)
Weight:	4,000 pounds
Width:	5 feet, 10 inches
Length:	20 feet, 1 1/2 inch
Height:	7 feet, 3 inches
Maximum elevation:	1,245 mils
Minimum elevation:	-100 mils
Traverse on platform:	6,400 mils
Crew:	Seven
Ammunition:	HE, Smoke, Illumination, RAP, DPICM.

SOVIET COUNTERPART:

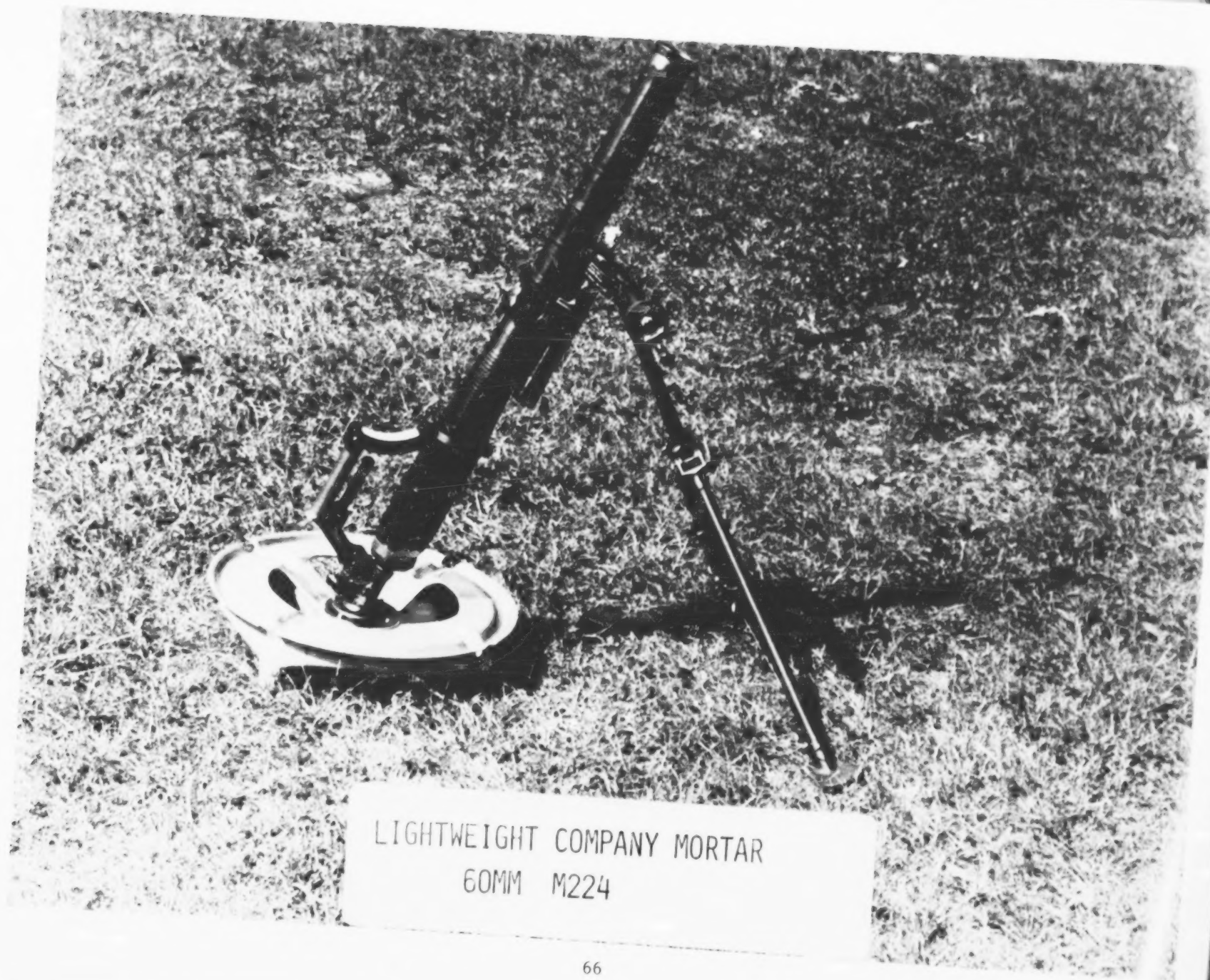
The nearest Soviet counterpart is the D-30 122mm howitzer. It is fielded in the Soviet and Warsaw Pact armies and has had extensive Foreign Military Sales dealings. Its range is 15.4km, it weighs 7,000 pounds, and requires a crew of 7 personnel.

PROGRAM STATUS:

The XM119 has finished its testing prior to Type Classification and the production decision scheduled for December 1985. The weapon will be co-produced by both the United Kingdom and a US producer to be selected.

CONTRACTOR:

Royal Ordnance, United Kingdom and US, un-named.



LIGHTWEIGHT COMPANY MORTAR
60MM M224

M224 60MM LIGHTWEIGHT COMPANY MORTAR SYSTEM

MISSION:

This 60mm mortar is designed specifically for the infantry company. It replaces the old M19 60mm mortar and will fire a new family of ammunition which offers increased performance and lethality. The M224 will be fielded in the Army Light Infantry, Airborne, Air Assault, and Mountain Divisions and in the Ranger battalions. This mortar fulfills the requirement for a lightweight, man-portable weapon and ammunition that can be utilized in all types of terrain. It is especially suited for small unconventional force operations. With a built-in trigger system, one man can set up and fire the weapon.

CHARACTERISTICS:

Range:	3,490 meters
Weight:	46.5 pounds
Length:	39 inches
Traverse on platform:	125 mils
Rate of Fire:	20 rounds/min-sustained rate of fire
Crew:	Two
Ammunition:	HE, Illum, Smoke, Full range and 1/10 range training rounds

SOVIET COUNTERPART:

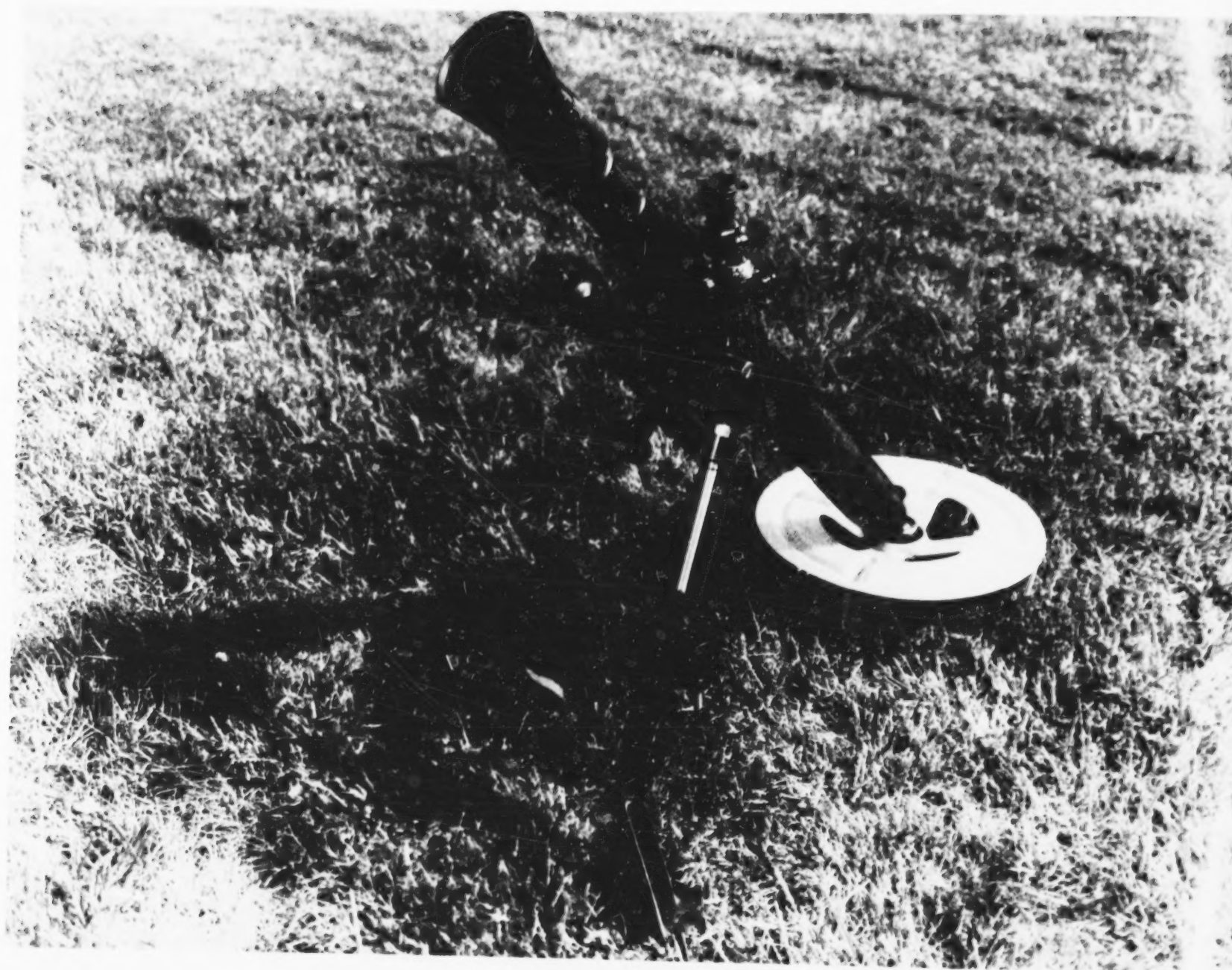
The closest Soviet counterpart would be the M-41 50mm mortar, which is now obsolete.

PROGRAM STATUS:

The Army has procured over 2,200 of these mortars. As of early FY86, several units have been fielded. Final testing of the entire new family of ammunition will occur in FY87.

CONTRACTOR:

Watervliet Arsenal, New York



M252 IMPROVED 81MM MORTAR

MISSION:

The M252 Improved 81mm mortar is the new medium mortar to be fielded in the US Army. It will replace the old M29 81mm mortar in the companies of the Army's armored and mechanized infantry and will become the battalion level mortar in the Light Infantry, Airborne, Air Assault, and Mountain Divisions. The M252, which consists of American and British components, has improved range, stability, fire control and lethality compared to the present M29A1 81mm mortar. It can fire all of the old 81mm ammunition on hand plus a new technology family of ammunition, which includes High Explosive, Illumination, Smoke obscurant, and Full Range and 1/10 Range Training rounds. Enhanced capability ammunition for the I-81 system will eventually be produced on-shore.

CHARACTERISTICS:

Range:	New HE	5625 meters
	New Smoke	5150 meters
	New Illumination	5625 meters
	Training Round	5625 meters
	1/10 Range Training	450 meters
Weight:	89 pounds	
Length:	57 inches w/Blast Attenuator	
Traverse on Platform:	125 left and right of center	
Rate of Fire:	15 rounds/minute	
Crew:	Five	

SOVIET COUNTERPART:

The Soviet counterpart is a towed 82mm mortar. It is fielded in the Soviet and Warsaw Pact Armies and has been fielded in many other countries. Its range is 2,550 meters, it weighs 128 pounds, and has a crew of 5.

PROGRAM STATUS:

The mortar system is in its 2nd year of procurement and is scheduled for fielding in early Fiscal Year 1987. The ammunition is to be Type Classified in early FY86 and will go into production shortly thereafter.

CONTRACTOR:

Royal Ordnance, United Kingdom



COPPERHEAD

SSION:

Copperhead, a cannon-launched guided projectile, is a 155mm artillery projectile designed to destroy stationary or moving enemy tanks and other high-value targets. It can be fired from any current or planned 155mm howitzer. When the projectile reaches the general vicinity of the target, it searches for and acquires the reflection of a laser beam projected on the target by a friendly forward observer. It then makes the necessary course corrections with its fins and homes in on the laser spot. Its accuracy is so good that it can literally drop down the open hatch of a moving tank at 16 kilometers. Copperhead is designed to complement rather than replace conventional 155mm projectiles in artillery units.

CHARACTERISTICS:

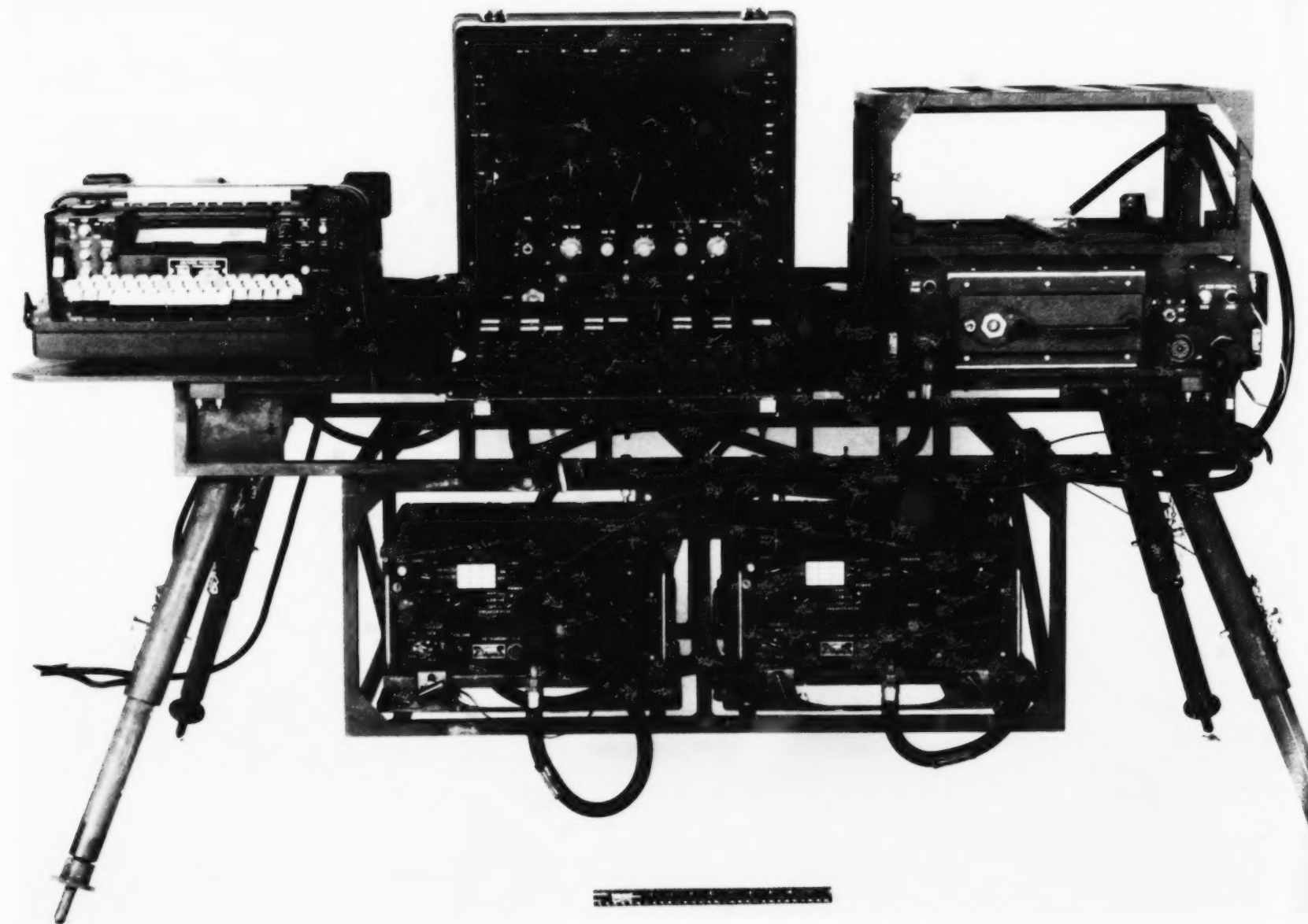
Range: 16 km
Weight: 137 lbs
Warhead: Shaped Charge Fragmentation

PROGRAM STATUS:

Copperhead is now in its seventh year of production (FY87).

CONTRACTORS:

Martin Marietta Aerospace (Orlando, FL)
Chandler Evans (West Hartford, CT)
Hamilton Standard (Farmington, CT)
Honeywell (Minneapolis, MN)
Lanson Industries (Cullman, AL)



BATTERY COMPUTER SYSTEM (BCS)

MISSION:

This versatile system provides improved fire control and ballistic computation capability for field artillery batteries. The BCS will greatly assist artillery batteries in bringing fast, accurate, and highly responsive fire on enemy targets. The system consists of a computer located at battery headquarters and data display unit at each weapon. It is capable of stand-alone operations or of interfacing with the full capability of the battalion TACFIRE system. In a matter of seconds BCS accepts digital fire requests from the forward observer, automatically computes firing data, and sends the firing data to each weapon. This capability also permits each howitzer to be positioned using the best protective terrain available, thereby providing enhanced survivability for the weapon and the unit. The BCS is also used to provide fire control to the Multiple Launch Rocket System and Lance Missile Units.

SOVIET COUNTERPART:

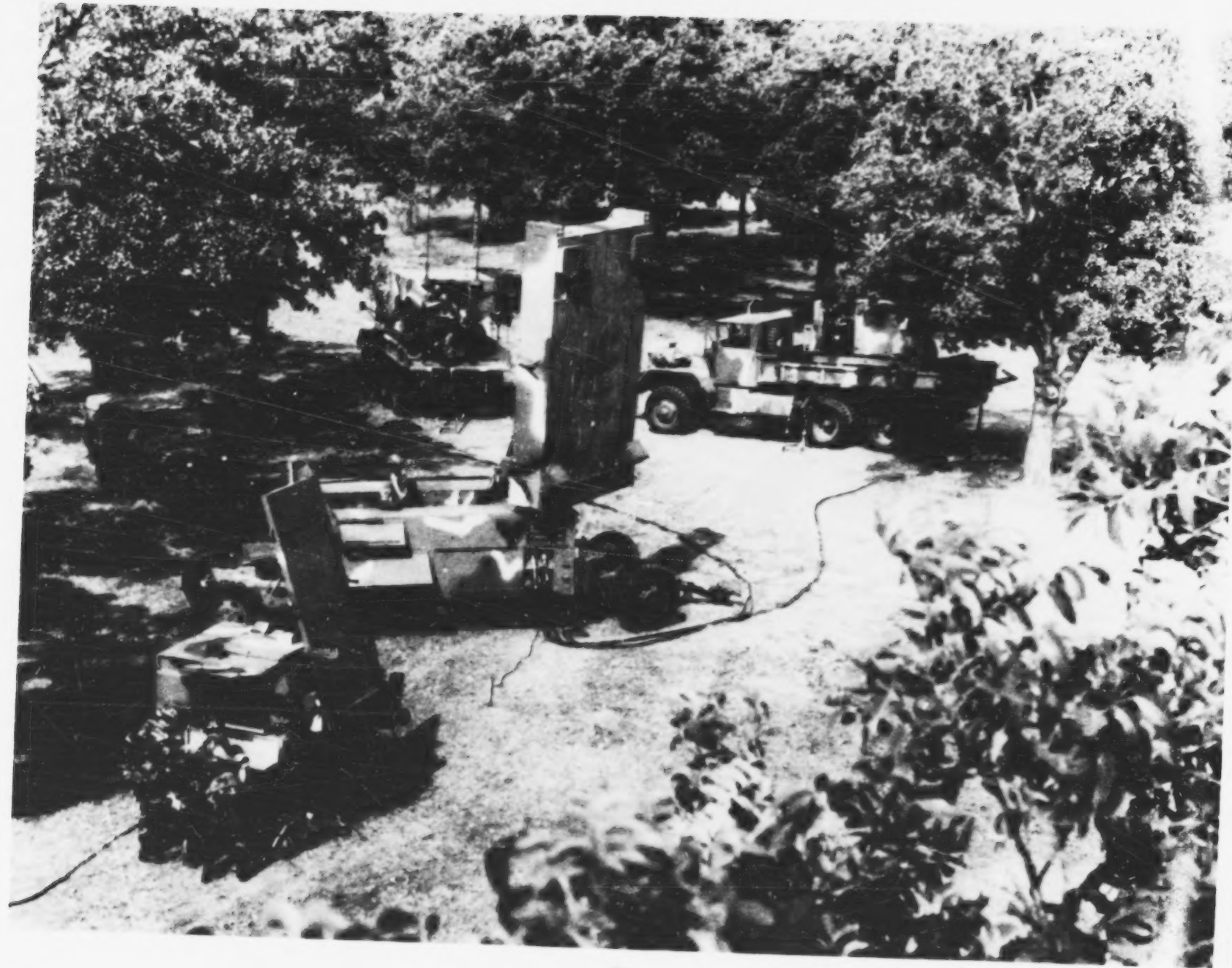
USSR has an automated fire control system at the battery level.

PROGRAM STATUS:

The BCS is typed classified Standard, and initial production began in 1980. Fielding of 522 systems has been completed; 317 remain. The first Reserve Component unit will receive BCS in the 3rd Quarter FY86.

CONTRACTORS:

Norden Division UTC (Norwalk, CT)
Marconi Space and Defense Systems Limited (UK)



FIREFINDER RADARS (ARTILLERY LOCATING RADAR
(AN/TPQ-37) AND MORTAR LOCATING RADAR (AN/TPQ-36))

MISSION:

FIREFINDER radars enable friendly forces to locate and bring immediate fire upon enemy mortar, artillery, and rocket-launching positions, silencing them before they can adjust their fires on friendly units and positions. The world's first automatic hostile-weapon-locating systems, FIREFINDER radars use advanced phased array antenna techniques complete with computer-controlled signal processing. They function by spotting enemy projectiles in flight and mathematically backplotting their trajectory. The position of the weapon is reported in grid coordinates that can be fed automatically into artillery fire direction center, enabling them to target the enemy weapons with guns, rockets, or other ordnance. In tests, both radars, in combination with fire control devices, enabled an artillery unit to have accurate counterfire on the way before the first enemy projectile struck the ground. In actual combat action in Lebanon (1984), the AN/TPQ-36 performed equal to or better than the test results. Each Army division is being equipped with two artillery locating radars and three mortar locating radars.

SOVIET COUNTERPART:

The closest Soviet counterpart to FIREFINDER radars is the Small Yawn, a system with significantly less capability.

PROGRAM STATUS:

Research and development was completed in FY80. The AN/TPQ-37 Initial Operational Capability was achieved in December 1980 when two radars were deployed to the 1st Cavalry Division Artillery at Ft Hood, Texas. The AN/TPQ-36 Initial Operational Capability was completed in February 1983 with the hand off of three radars to the 1st Armored Division in USAREUR.

CONTRACTOR:

Hughes Aircraft (Fullerton, CA)



GROUND/VEHICLE LASER LOCATOR DESIGNATOR (G/VLLD)

MISSION:

G/VLLD is a precision fire support tool used to find the range, azimuth, and elevation to enemy targets in order to minimize the time required to bring conventional artillery fire-for-effect on the target and save ammunition in the process. The G/VLLD can also project an invisible, coded, laser spot on selected targets so that laser homing munitions such as Copperhead, Hellfire, and the US Marine Corps Laser Maverick can home in on laser spot. G/VLLD will be employed by forward artillery observers from vehicles (such as Fire Support Team Vehicles (FISTV), bunkers, or foxholes). After using G/VLLD to locate the target, the forward observer provides the target coordinates and other data to the fire direction center. If laser homing munitions are to be used, the operator switches on the laser designator before the round/missile is due to strike. The homing munition, as it nears the target, "looks for" the laser spot, and after locating it on the target, flies into it. The G/VLLD can then be slewed to the next target, enabling the forward observer to engage several targets in rapid succession.

CHARACTERISTICS:

Weight: 52 lbs
Rangefinder Range: 10 km

SOVIET COUNTERPART:

The Soviets are known to be working with low-energy lasers for munitions guidance.

PROGRAM STATUS:

G/VLLD was initially fielded in the 4th quarter, FY82. It is currently in full-scale production.

CONTRACTOR:

Hughes Aircraft Co. (El Segundo, CA)



FIRE SUPPORT TEAM VEHICLE (FISTV)

MISSION:

The M981 or FISTV is a modified M113A2 Armored Personnel Carrier that gives the Field Artillery's fire support teams the capability to rapidly direct mortar, artillery, and air-delivered fire support using any of its four radios and to designate targets for laser guided munitions such as Copperhead and HELLFIRE. In order to perform these functions, this vehicle is equipped with a Ground/Vehicle Laser Locator Designator (G/VLLD), a northseeking gyrocompass, and a Position Locating and Reporting System (PLRS). These electronic components enable rapid generation of very accurate target location data which is transmitted to the artillery battalion's fire direction center by an on-board 4 channel digital message device. The FISTV also provides crew protection against small arms fire and fragmenting artillery. Tactical missions performed include surveillance, target acquisition, target designation, location, and communications.

CHARACTERISTICS:

Weight:	26,300 lbs
Range:	300 miles
Cross-Country Speed:	19 mph
Armament:	7.62mm Machine Gun
Crew Size:	4

SOVIET COUNTERPART:

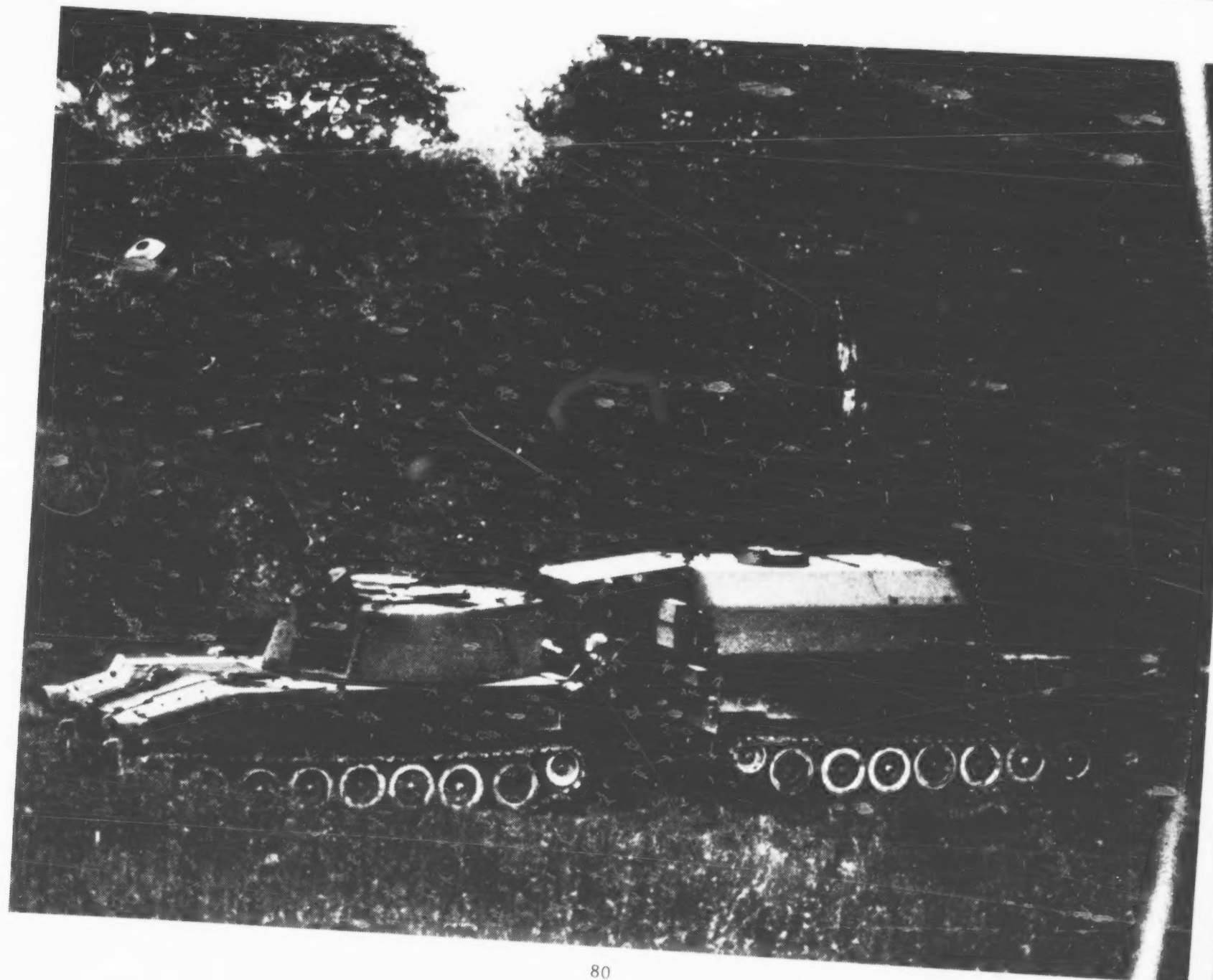
The ACRV-2 is a Soviet vehicle found at battery and battalion level and artillery liaison teams. It weighs 30,000 lbs and supports a crew of five personnel, and is equipped with a number of target acquisition devices.

PROGRAM STATUS:

Delivery of the first production model of the FISTV was in December 1984. A total of 729 kits are scheduled for procurement through FY86. The first unit equipped was the 24th Infantry Division, Ft Stewart, Georgia, in August 1985. Fielding scheduled through FY87 will be to Korea and Germany.

CONTRACTOR:

Emerson Electric (St Louis, MO)
Magnavox Electronic Systems Co. (Ft Wayne, IN)
Hughes Aircraft Co. (Culver City, CA)
FMC Corporation (San Jose, CA)



FIELD ARTILLERY AMMUNITION SUPPORT VEHICLE (FAASV)

MISSION:

The Field Artillery Ammunition Support Vehicle (M992) is designed to provide ballistic protection for ammunition, and powered ammunition handling, for the Army's M109 Self-Propelled Field Artillery Battalions. The presently fielded M548 ammo resupply vehicles are unarmored, vulnerable and lacking in survivability. The FAASV is equipped with hydraulically powered ammunition handling equipment consisting of an automatic stacker and a conveyor to allow transfer of ammunition to the supported howitzer. An armored rear door on the FAASV swings up to provide overhead protection during ammunition transfer to the howitzer. A new conveyor is being developed to allow ammunition transfer with all vehicle doors closed. FAASV shares a common chassis with the M109A2 howitzer, and retains the ballistic protection, cross-country mobility and road speed of that vehicle.

CHARACTERISTICS:

Range:	220 miles	Secondary Armament:	M16A2
Weight:	57,500 lbs	Crew:	4
Length:	267 inches	Cruising Range:	220 miles
Height:	126 inches	Road Speed:	35 mph
Width:	124 inches	Payload:	155mm - 90 rds
Main Armament:	.50 cal Machinegun		

SOVIET COUNTERPART:

None.

PROGRAM STATUS:

Acquisition of the FAASV began in FY83 and fielding will begin in Europe in FY86.

CONTRACTOR:

Bowen-McLaughlin-York (York, PA).

Combat Support is an aggregation of the following mission areas dedicated to providing operational assistance to the combat arms:

(1) Engineer Support relates to combat engineer efforts and mine/countermine warfare.

(2) NBC relates to supporting combat operations in a nuclear, biological, chemical environment.

(3) Theater Tactical Intelligence relates to providing theater/tactical commanders with intelligence and information to support planning, the conduct of combat operations, and the readiness of forces for combat operations.

COMBAT SUPPORT



M9 ARMORED COMBAT EARTHMOVER (ACE)

MISSION:

The M9 ACE is a highly mobile (tracked), amphibious armored earthmoving vehicle designed to provide critical combat engineer support to forward fighting forces. In support of the highly mobile AirLand Battlefield, the M9 ACE reduces enemy and natural obstacles for friendly maneuver forces, digs fighting positions for weapon systems enhancing their survivability, and constructs obstacles to slow and channelize enemy maneuver, making threat forces more vulnerable to friendly fire. Its mobility and survivability enable the M9 to move with the flow of battle and to respond immediately to the maneuver commanders' needs for mobility, countermobility, survivability and general engineering missions. Tough enough to live and fight with the infantry and fast enough to move with tanks, the M9 ACE is an essential force multiplier and a key member of the combined arms team on the AirLand Battlefield.

CHARACTERISTICS:

Weight: Empty: 36,000 lbs
Loaded: 54,000 lbs
Speed: 30 mph
Air Transportable: C-130, C-141B, C-58 aircraft
Amphibious: 3 mph
Survivable: Small arms, artillery fragmentation,
and operator NBC protection.

SOVIET COUNTERPART:

Although the Soviets have no direct counterpart to the M9 ACE, they do employ several pieces of equipment, each fielded in large quantities, which presently give Soviet combat units at least twice the engineer support of comparable US units. Examples are their MDK series of ditching machines, the BAT/M heavy, tracked dozer and the IMR Armored Engineer Tractor. The latter consists of a T-55A tank chassis with hydraulically controlled hinged blade, crane with telescoping boom, armored cupola and internal overpressure system.

GRAM STATUS:

The 15 initial production vehicles were delivered and tested during FY84. A Follow-On Evaluation (FOE) was conducted during March-June 1985. The FOE results contributed to an Army go-ahead to full production of the M9 ACE. A competitive single-year procurement with priced options is expected to begin in FY86. In March 1986, the 7th Infantry Division (Light) will be the first unit equipped with the M9 ACE.

TRACTOR:

Initial Production Vehicles were manufactured by Pacific Car and Foundry Company (Renton, WA)



M88A1 MEDIUM RECOVERY VEHICLE

MISSION:

The M88A1 is a full-tracked, armored vehicle designed for hoisting, winching and towing operations to effect battlefield recovery and evacuation of tanks and other tracked combat vehicles. The M88A1 is the primary recovery vehicle in the Army inventory for M1 Abrams tank, M2/M3 Bradley Fighting Vehicles, M60 series tanks, and heavy self-propelled artillery.

CHARACTERISTICS:

Length:	325 inches	Power Train:	12-cyl, 750 hp air-cooled diesel engine with 3 speed automatic transmission
Width:	135 inches		
Height:	123 inches	Cruising Range:	30 miles
Weight:	56.0 tons	Draw Bar Pull:	90,000 lbs
Top Speed:	27 mph; 18 mph with towed load	Boom Capacity:	25 tons
Armament:	One .50 cal machinegun		

SOVIET COUNTERPART:

The Soviets have historically based recovery vehicles on existing chassis design. The most current is a vehicle based on a T-72 chassis. T-62, T-54, T-55-T, and JSU-T recovery vehicles are still in the Soviet inventory.

PROGRAM STATUS:

Conversion of all M88's in the US Army to M88A1's was completed in February 1982. The M88A1 is currently in procurement. The M88A1 is being fielded in Mechanized Infantry Battalions in support of the Bradley Fighting Vehicles.

CONTRACTORS:

BMY Company (York, PA) GMC, Detroit Diesel Allison Div. (Indianapolis, IN) Teledyne Continental Motors (Muskegon, MI) Firestone Tire (Moblesville, IN) Goodyear Tire (St Marys, OK) Standard Products (Port Clinton, OH) Pacific Car & Foundry (Renton, WA)	Bata Engineering (Batawa, Ontario, Canada) Adviondack (Watervliet, NY) Rogers Olympic Corp (Seattle, WA) Buckeye Steel Casting (Columbus, OH) Ferguson Gear (Gastonia, NC) Berwick Forge (Berwick, PA)
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MINE CLEARING LINE CHARGE (MICLIC)

MISSION:

Army ground combat forces require a system which can be rapidly deployed by engineer units to clear lanes in minefields. Operations must be conducted under enemy fire and in daylight or darkness. The Army is planning for the acquisition of the US Marine Corps Trailer-Mounted M58 Line Charge System, which consists of the M58 high explosive (HE) linear demolition charge, the Mark 22 rocket (5 inch) for projecting the explosive charge across the minefield, a rocket launcher with firing kit, and the standard Army M353 trailer. The M68 inert linear charge is used for training. The charge is contained in a box which is cradled on the rocket launcher. The launcher in turn mounts on the trailer. The assembled system is towed by a light forces engineer vehicle to about 50 meters from the edge of a minefield and the rocket is fired pulling the line charge across the minefield with it. In heavy forces, the MICLIC is towed by a tank or engineer M113 Armored Personnel Carrier. After the line charge is resting across the minefield, the operator detonates it.

Three MICLIC systems will be issued to each engineer company in the light forces, Airborne, Airmobile, and Light Infantry Divisions and separate Airborne and Light Infantry Brigades. Two MICLIC trailers will be found in Heavy Division Engineer Companies equipped with the Robatic Obstacle Breaching Assault Tank (ROBAT).

CHARACTERISTICS:

System Weight:

2.5 tons

Explosive Line Charge:

Length - 350 ft; weight - 1750 lbs

Dimensions of Minefield Breach:

8 meters x 100 meters

SOVIET COUNTERPART:

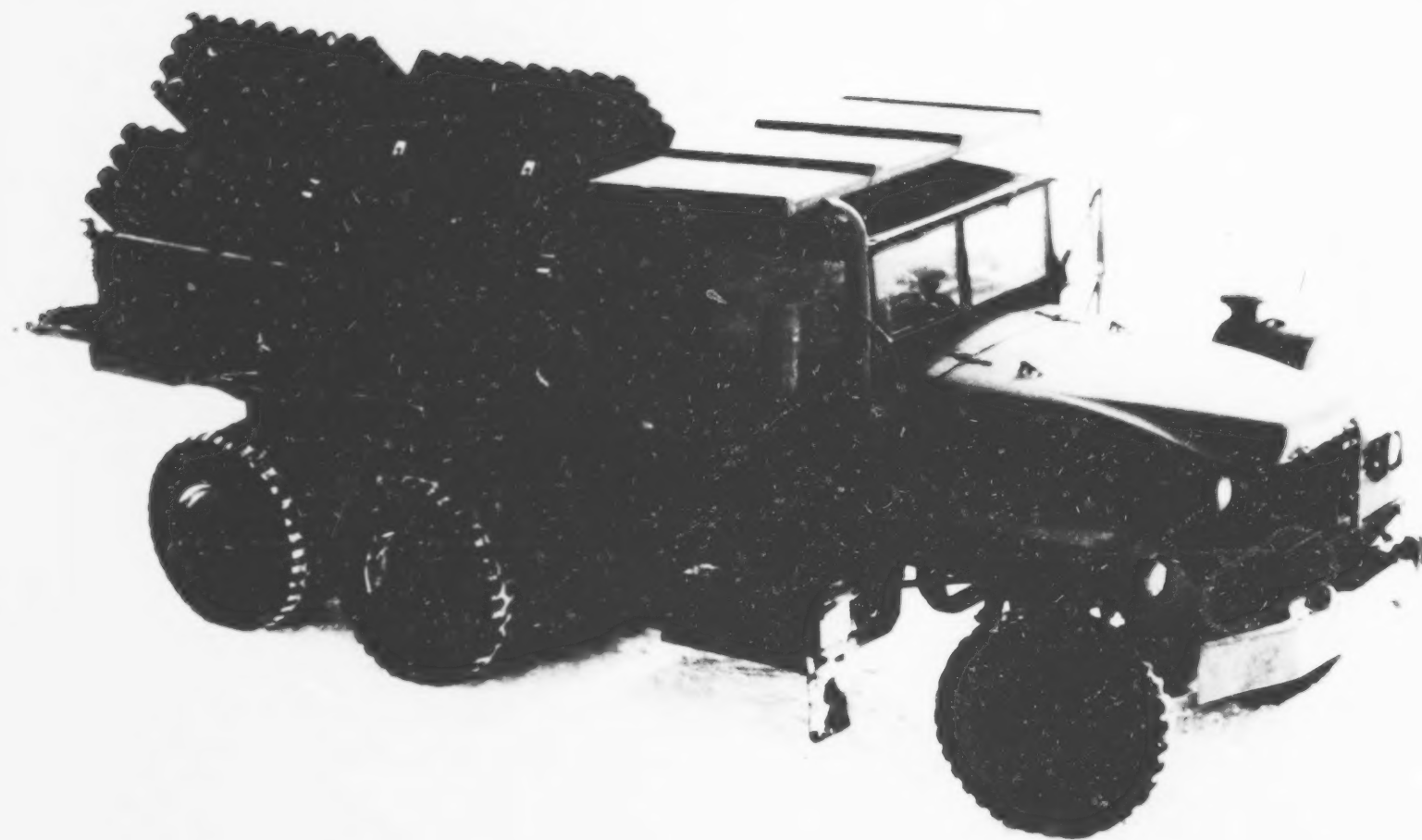
The Soviets have fielded the M1979, second generation tracked explosive mine breaching system. The M1979, assigned to Soviet Divisional Engineer Battalions, performs similarly to the US MICLIC, clearing a lane approximately 8 meters by 75 meters with a charge.

PROGRAM STATUS:

The USMC MICLIC began production in FY83. The Army procurement, with a Mod 4 Mark 22 Rocket, will begin in FY86.

FACTORY:

A & W Fabricators (Cookeville, TN)
Thiokol, Inc (Shreveport, LA)
Martin Marietta Ordnance System, Inc. (Milan, TN)



MULTIPLE DELIVERY MINE SYSTEM (VOLCANO)

MI :

VOLCANO is a rapid mine dispensing system. GATOR antitank (BLU-91) and antipersonnel (BLU-92) mines, now in procurement by the Air Force and the Navy, will be loaded into canisters which can be placed in standard dispenser racks for Army helicopter or ground vehicle use. VOLCANO is composed of mounted Launcher Racks with mounting hardware, an electrical Dispenser Control Unit, and the Mine Canister. VOLCANO provides a rapid and flexible means of placing tactical minefields to delay, canalize, and interdict attacking enemy forces. The helicopter system, which will replace the M56 helicopter delivered mine, will permit low-altitude, reduced vulnerability, delivery of about 800 mines by a single Black Hawk (UH-60A). Ground vehicles will deliver varying quantities of mines.

Air Systems will be issued to equip four helicopters per Combat Support Aviation Company. Ground systems will be issued, three per Divisional Engineer Company and one per Corps Combat Engineer Company. Mine Canisters will be supplied within the class V supply system.

CHARACTERISTICS:

VEHICLES	NUMBER OF SYSTEMS	NUMBER OF CANISTERS	NUMBER OF MINES
UH-60A Black Hawk	One-4 Racks	138	828
M548 Cargo Carrier	One-4 Racks	160	960
M817 5-Ton Dump Trk	One-4 Racks	160	960
M113 APC	One-2 Racks	80	480

SOVIET COUNTERPART:

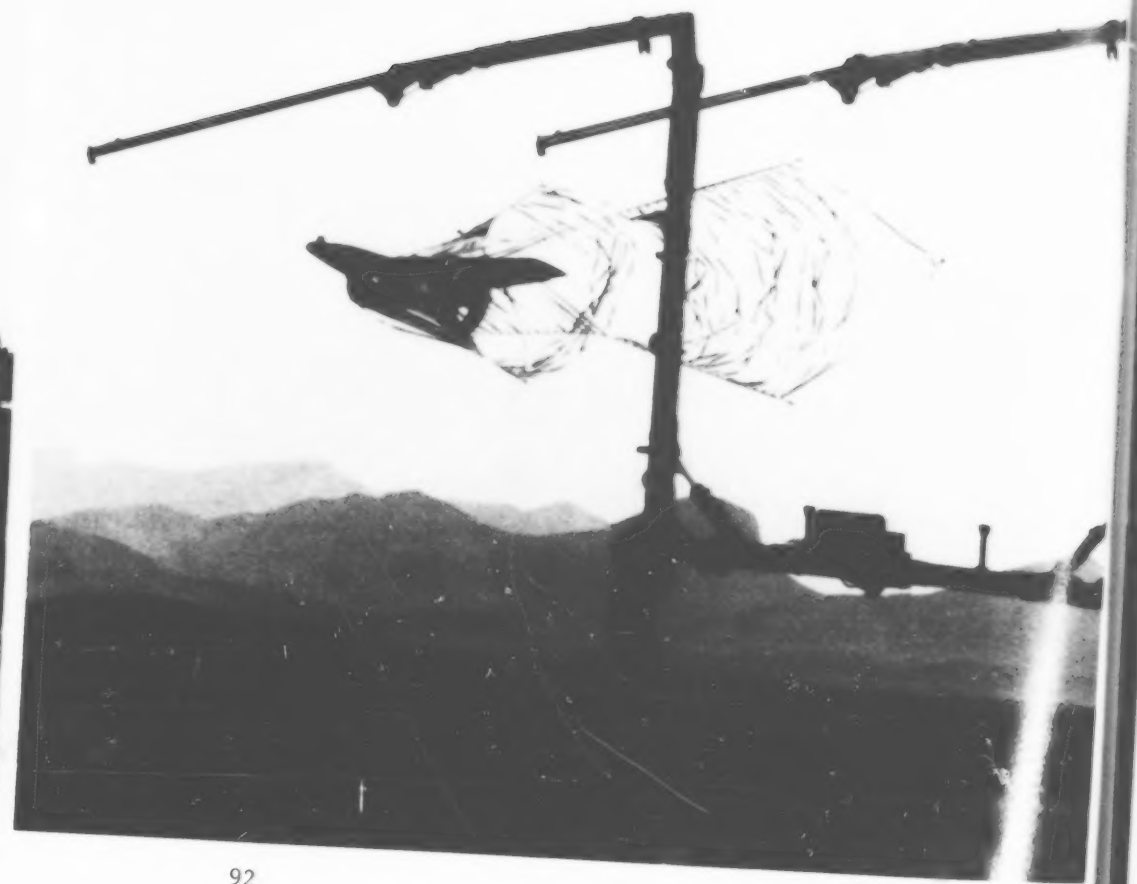
The Soviets can deliver mines from helicopters and ground vehicles, but their systems are not directly comparable to the VOLCANO.

PROGRAM STATUS:

The VOLCANO is to begin procurement in FY86 to meet the urgent requirement for Scattermine Systems in the light infantry divisions.

CONTRACTORS:

Honeywell (Hopkins, MN)
Aerojet (Downey, CA)
Day & Zimmerman, Inc. (Texarkana, TX)



AQUILA REMOTELY PILOTED VEHICLE (RPV)

MISSION:

The Aquila RPV is a small propeller-driven, automatically and remotely controlled aircraft. It is intended primarily for target acquisition and field artillery support, and is designed to be survivable over hostile territory. The system can perform reconnaissance, detect, identify, locate and acquire targets, adjust artillery fire, laser-designate targets for destruction by laser-guided munitions, and perform damage assessment. The Aquila is rail-launched from a flatbed truck, and upon completion of its mission, will be recovered and reused. Initially, the air vehicle will carry a small TV, and will subsequently be provided with a Forward-Looking Infrared (FLIR) sensor which will give the system a 24 hour capability. The signals from these devices are transmitted back to a mobile ground control and processing station by a jam-resistant data link. The Aquila RPV allows the Army to see into areas masked to other reconnaissance means and to accurately strike well beyond the Forward Line of Troops (FLOT) into zones protected by formidable enemy ground or air defenses.

CHARACTERISTICS:

Weight: 265 lbs at launch
Endurance: 3 hours
Speed: 49-98 knots

SOVIET COUNTERPART:

The Soviets are believed to have at least three tactical drones used for reconnaissance and other missions. None of them are believed to have the operational capabilities of Aquila.

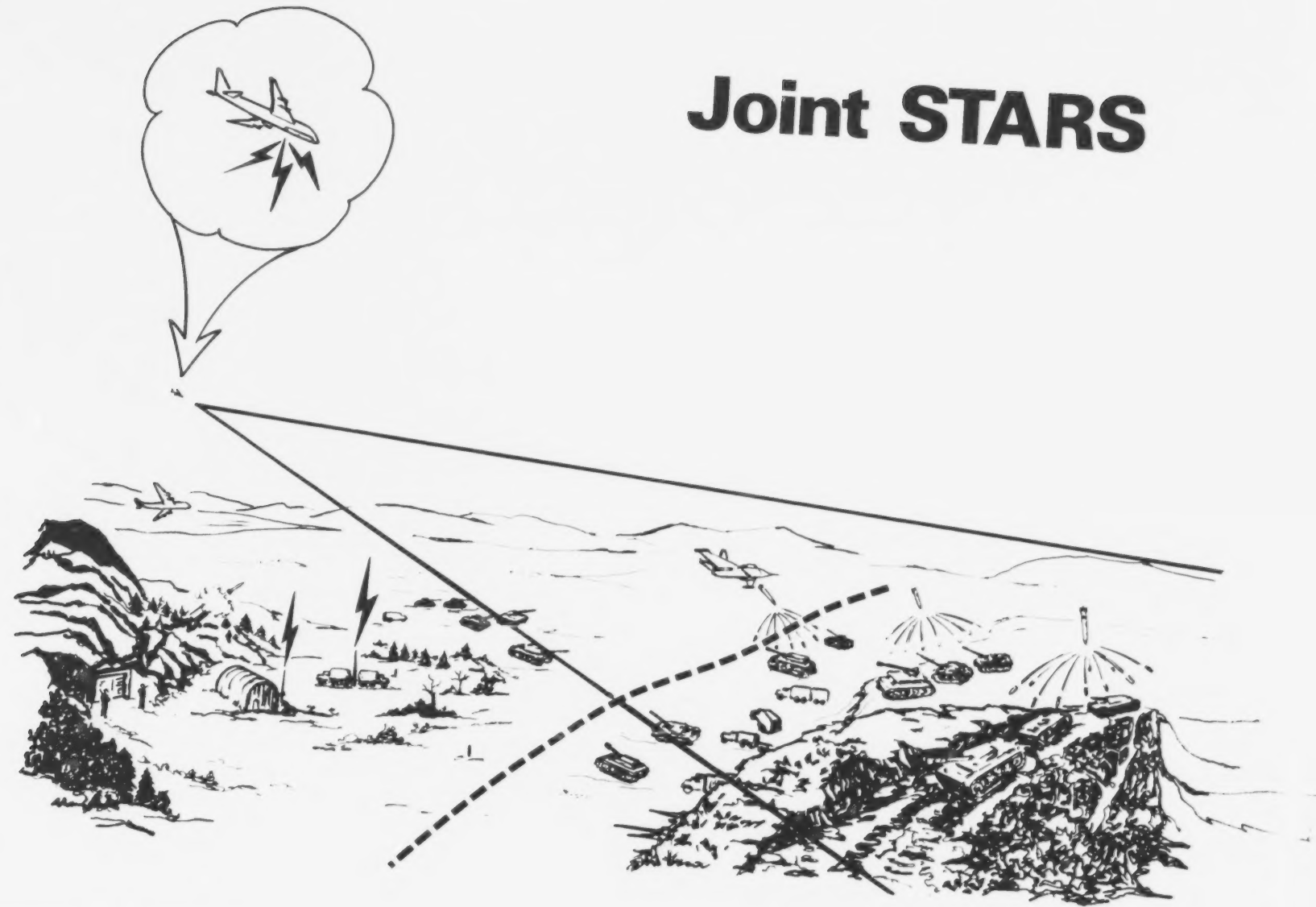
PROGRAM STATUS:

The Aquila RPV is currently in engineering development. Flight tests are now underway. Development Test II and Operational II are scheduled in 1986. Launch, navigation, telemetry, laser designation for Copperhead, jinking, command and control of the Air Vehicle, and endurance have been demonstrated.

TRACTORS:

Lockheed Missiles and Space Co., Lockheed Austin Division (Austin, TX)
Harris Corporation (Melbourne, FL)
Dornier GmbH (Friedrichshaffen, West Germany)
Kearfott Singer (Little Falls, NY)
Westinghouse (Baltimore, MD)
Hitco (Auburn, WN)
Brunswick Corp. (Marion, VA)
All-American Engineering (Wilmington, DE)

Joint STARS



JOINT SURVEILLANCE AND TARGET ATTACK RADAR SYSTEM (JOINT STARS)

MISSION:

Joint STARS is a battle management and targeting system which detects, locates, tracks, classifies and assists in attacking both moving and stationary targets beyond the Forward Line of Own Troops (FLOT). This allows the commander to **DECIDE** (situation intelligence) - **DETECT** (targeting intelligence) - **DELIVER** (trigger delivery of ordnance, direct attack aircraft or counter enemy movements by maneuver of friendly forces). The Air Force is responsible for the Prime Mission Equipment (PME) - platform, radar, data link. The Army is responsible for the Ground Station Modules (GSM) - tactical data processing and evaluation center that links the Joint STARS radar (through the data link) to Army C3 nodes at corps and division levels. The Army's radar data is processed in the GSM. Situation development information is transmitted through the ASAS system and targeting information is transmitted through the TACFIRE/AFATADS system to their respective users.

CHARACTERISTICS:

Detection range:
Aircraft:
Target:

In excess of 100 km into hostile territory
C-18 (militarized Boeing 707)
Moving, fixed

SOVIET COUNTERPART:

None known.

PROGRAM STATUS:

The PME and GSM are in Full Scale Engineering Development. GSM production is scheduled to begin in late FY 1987. A field test demonstration with the fully operational GSM and a full scale development platform/radar is planned for early FY 1990.

CONTRACTOR:

Motorola Corporation (Tempe, AZ) (Ground Station)
Honeywell, Incorporated (Minneapolis, MN) (Simulator/Trainer).
Grumman Aerospace (Bethpage, NY/Melbourne, FL) (PME)
Norden Systems Division of United Technologies (Norwalk, CT)(PME).



OV-1D (MOHAWK) SURVEILLANCE SYSTEM

MISSION:

The OV-1D, MOHAWK, is a two place, twin turbo-prop, combat aircraft equipped with side-looking, airborne radar, photographic or infrared sensors capable of monitoring enemy operations in daylight, darkness, and inclement weather. The primary sensor is the AN/UPD-7 airborne radar surveillance system. When used in conjunction with a data link, the radar information is transmitted to a ground based receiving system which has the capability to convert the received signals back to film for near real time viewing analysis. An Electronic Counter Countermeasure capability is incorporated.

CHARACTERISTICS:

Mission Weight:	18,384 lbs
Infra Red System:	AN/AAS-24
Camera System:	KA-60/76
Side Looking Airborne Radar:	AN/APS-94F
Endurance:	3.0 hrs
Crew:	2

PROGRAM STATUS:

The OV-1D is currently deployed in Military Intelligence Battalions (Aerial Exploitation): two OCONUS, two FORSCOM, and one National Guard. The current program funds a service life extension program, an avionics upgrade and two safety related product improvements. This will result in a significant increase in readiness and mission capability and insure continuous intelligence to the tactical commander.

CONTRACTORS:

Grumman Aerospace (Stuart, FL)
Motorola Inc. (Tempe, AZ)



QUICK FIX

MISSION:

Quick Fix is a tactical, electronic warfare, heliborne jamming system configured in the EH-1H, EH-1X, and EH-60A helicopters. Each aircraft has the capability to intercept and jam radio communications, and the EH-1X and EH-60 versions can also locate (direction finding) communication transmitters. Quick Fix aircraft will be organic to the division, separate brigade, and armored cavalry regiment.

CHARACTERISTICS:

	<u>EH-1H</u>	<u>EH-1X</u>	<u>EH-60A</u>
Mission Gross Weight (lbs):	8800	9200	16500
Time on Station (hrs):	1.7 hrs	1.5 hrs	4.8 hrs

SOVIET COUNTERPART:

The Soviets have fielded a family of dedicated electronic warfare helicopters using at least two variants of the MI-8 and MI-17 helicopters.

PROGRAM STATUS:

Several interim EH-1H Quick Fix systems are currently fielded; the interim EH-1X system is in production, and the EH-60A, QUICK FIX, is in development.

CONTRACTORS:

Electromagnetic Systems Laboratories, Inc. (Sunnyvale, CA)
Sikorsky Aircraft (Stratford, CN)
TRACOR, Inc. (Austin, TX)



QUICK LOOK

MISSION:

The Quick Look System is an airborne, automatic, computer-controlled electronic intelligence system that provides corps and division commanders with the location and type of threat noncommunications emitters. Quick Look's airborne electronic equipment is mounted in the RV-1D, Mohawk, aircraft. The remainder of the Quick Look system is mounted in several surface vehicles.

CHARACTERISTICS:

Mission Weight: 18,384 lbs
Endurance: 3.0 hrs

SOVIET COUNTERPART:

The Soviets are presumed to have aircraft capable of performing the same role and mission as Quick Look.

PROGRAM STATUS:

The Quick Look system is in operational use with the Army's Aerial Exploitation Battalions. The current Mohawk Block Improvement program will also include the RV-1D. This upgrade program will increase the structural life of the Mohawk, upgrade the on-board avionics and incorporate a controls and display system in the cockpit. The RV-1D modification program will also install a full suite of aircraft survivability equipment and improve the deicing capability of the aircraft. Additional improvements to be completed are a stall warning system and additional communication security equipment.

CONTRACTORS:

Grumman Aerospace (Stuart, FL)
UTL Corp (Dallas, TX)



IMPROVED GUARDRAIL V

MISSION:

Improved Guardrail V, a combined airborne and ground communications intelligence system, is designed to intercept and locate enemy communications emitters. The system provides timely and accurate data on enemy locations and plans and will enable the commander to concentrate his combat resources at the critical time and place. The Guardrail V system uses the RU-21H aircraft; the Improved Guardrail V system uses the RC-12 aircraft; and, future plans will result in the fielding of a Guardrail Common Sensor system which will use the RC-12K airframe.

CHARACTERISTICS:

	RU-21H	RC-12D	RC-12K
Mission Weight:	10,200 lbs	14,000 lbs	15,600 lbs
Pressurization:	No	Yes	Yes
Service Ceiling:	18,000 ft	25,000 ft	25,000 ft
Endurance:	4.0 hrs	5(+) hrs	5(+) hrs
Crew:	2	2	2

SOVIET COUNTERPART:

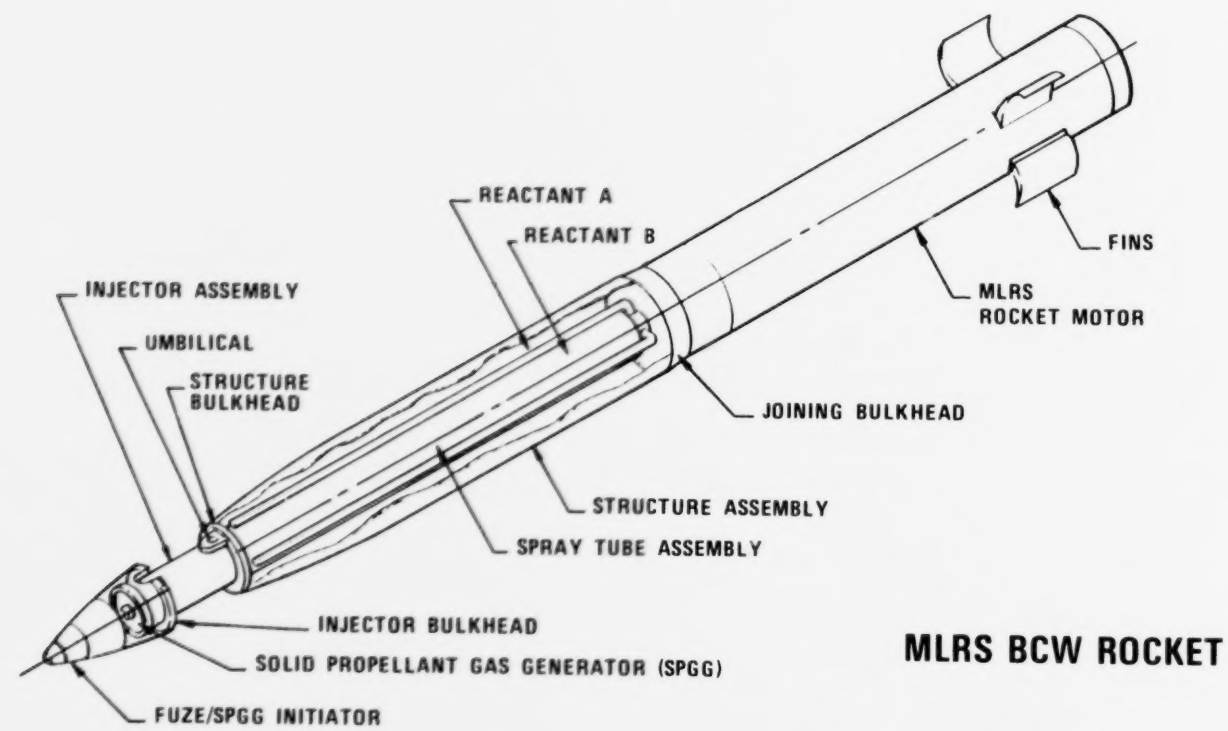
The Soviets have a wide variety of airborne and ground-mounted electronic warfare systems. There is no known Soviet system comparable to Guardrail, although the AN-12 CUB C performs similar missions.

PROGRAM STATUS:

The currently deployed Guardrail V System's airborne equipment is mounted on RU-21H aircraft and will continue to be used. Contractual work for the Improved Guardrail V system, to mount the airborne equipment in RC-12D aircraft and to increase system performance and interoperability, was started in 1981, and the first two systems have been fielded.

CONTRACTORS:

Beech Aircraft Corporation (Wichita, KS)
Electromagnetic Systems Laboratories, Inc. (Sunnyvale, CA)



BINARY CHEMICAL MUNITIONS

MIS :

National defense policy dictates that the US reestablish a credible retaliatory chemical warfare capability. This policy is based on the belief that such a capability is the most effective deterrent to the first use of chemical weapons by a potential enemy. The Army's chemical munitions stockpile has an average age of 26 years and is deteriorating and becoming obsolete. The binary chemical munition is a means of modernizing this stockpile in a manner which is both technologically feasible and environmentally acceptable. The binary concept is a process by which a lethal chemical agent is formed from nonlethal components by means of a chemical reaction during flight of the weapon to a target. Significant advantages over current conventional chemical munitions are achieved in safety, transportation, production, storage, handling and final disposal.

CHARACTERISTICS:

Type binary munitions:

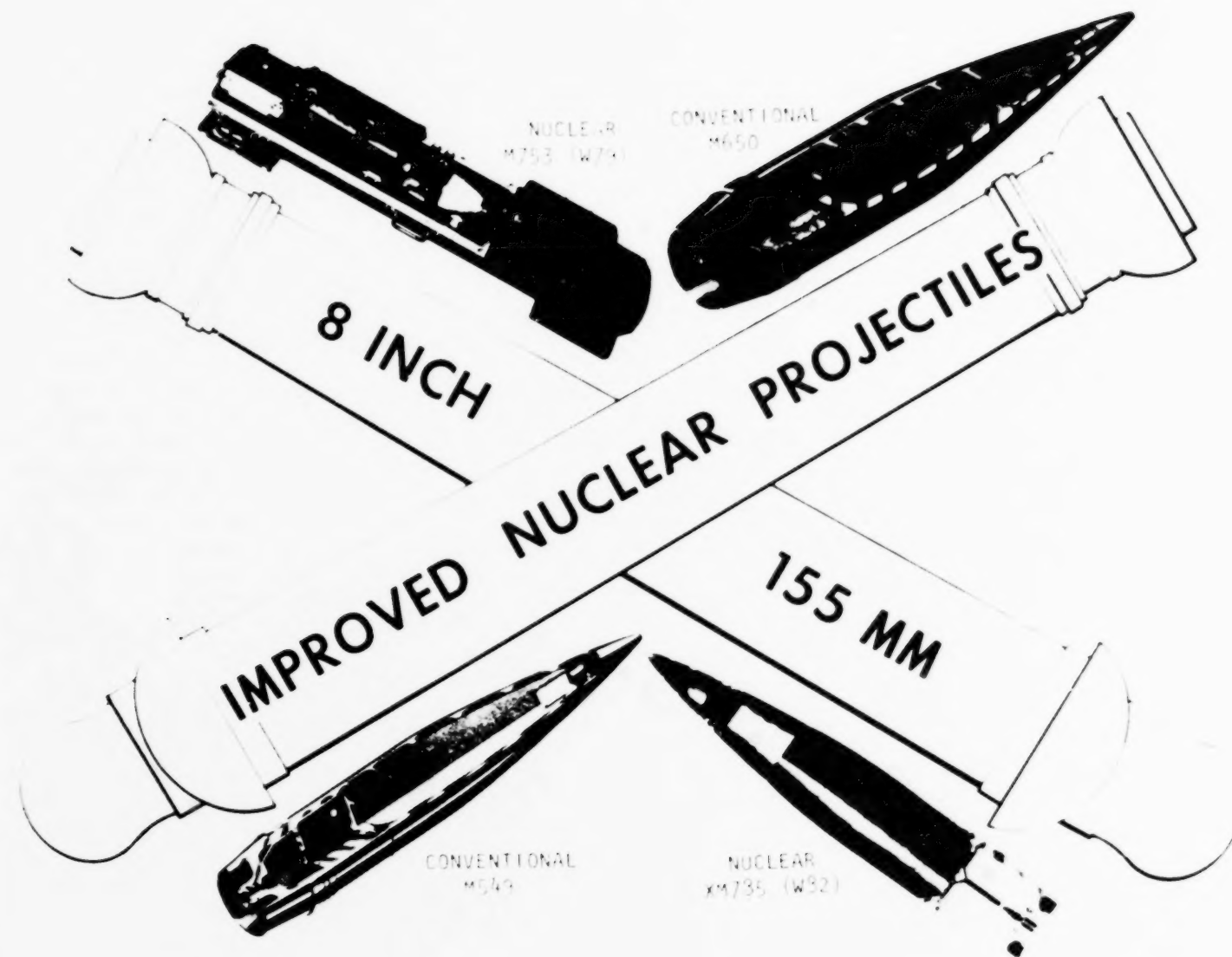
Multiple Launch Rocket System (MLRS)
Binary Chemical Warhead
155mm Binary Chemical Projectile

SOVIET COUNTERPART:

Soviet forces are trained, equipped and structured to perform offensive and protective chemical warfare actions on the battlefield. They have produced, stockpiled and deployed large quantities of chemical agents and munitions. They have the tactical doctrine for the use of chemical weapons against targets for which they are best suited to gain tactical advantage. The circumstances under which the Soviets would initiate chemical warfare are not known. Their ability to do so, however, is undeniable, and they are likely to use chemical weapons against high priority, selected targets. Chemical weapons already have become available to third world countries. The current inadequacy of the US reliability capability increases the probability of use of chemical weapons by the Soviets and other nations.

PROGRAM STATUS:

The President has determined that modernization of the chemical deterrent retaliatory stockpile is essential to the national interest and, in accordance with public law, has so certified to the Congress. The Army is pursuing development of a credible deterrent retaliatory capability by adding two binary chemical munitions to its arsenal. Development of the 155mm binary chemical projectile has been completed and the projectile is ready to enter production when funds to complete facilitization and production startup are authorized and appropriated. The MLRS binary chemical warhead is in the advanced development phase. This system complements the 155mm binary chemical projectile, while providing greater range and area coverage than front line artillery to engage rear area military targets.



IMPROVED NUCLEAR PROJECTILES

MIS S I O N:

Improved nuclear projectiles, for the standard 8-inch and 155mm Howitzers, are designed to deter or defeat enemy nuclear or conventional attack. They will replace the aging projectiles currently in the inventory. The modernized projectiles are more accurate, have longer range, and contain security devices and command-disable features that prevent unauthorized use. The new 8-inch round entered production in FY81. Unlike the old 8-inch projectile, it does not require field assembly or a special spotting round. Preparation for firing of the new projectile only requires setting and insertion of the electronic fuze. The new 155mm round is being developed. It will be more effective than the current 155mm nuclear projectile because of its improved accuracy, increased range, and greater yield. It is compatible with the SP/FH 70 NATO Howitzers and will be ballistically similar to the M549 high-explosive, Rocket-Assisted Projectile. Fielding of an improved 155mm nuclear projectile will improve the capability and survivability of tactical nuclear forces by expanding the modern nuclear capability to the US and NATO 155mm cannon forces.

SOVIET COUNTERPART:

The Soviets have a wide variety of tactical nuclear weapons. They have introduced several new nuclear-capable artillery pieces in the past few years. The number of nuclear-capable artillery tubes has gone from less than 800 to over 7,700 in about ten years. An additional 4,000 152mm howitzers have a potential nuclear capability.

PROGRAM STATUS:

The new 8-inch round entered production in FY81. The 155mm is being developed.

CONTRACTORS:

Motorola Corp. (Scottsdale, AZ)
Sandia National Laboratories (Livermore, CA)
Sandia National Laboratories (Albuquerque, NM)
Chamberlain Manufacturing Corp. (Waterloo, IA)
Lawrence Livermore National Laboratory (Livermore, CA)
Ferrulmatic, Inc. (Patterson, NJ)

The Combat Service Support mission area relates to providing tactical commanders with supply, maintenance, personnel and administration, civil affairs, medical, transportation, and other services. In terms of equipment modernization of the force, this handbook includes those major items that the Army is developing to improve its tactical transportation capability.

COMBAT SERVICE SUPPORT



BLACK HAWK

MISSION:

The Black Hawk is replacing the UH-1 "Huey" in air assault, air cavalry, and aeromedical evacuation missions. The UH-60A, Black Hawk, can carry more than twice the UH-1 payload and is capable of transporting an entire 11-man, fully equipped squad faster and in most weather conditions. The Black Hawk is the first utility helicopter that adds to the Army's Division level mobility; for example, it can reposition a 105mm howitzer, its crew of 6, and up to 30 rounds of ammunition in a single lift. Its critical components and systems are armored or redundant to enable it to withstand multiple small arms hits, and its airframe is designed to progressively deform on impact to protect the crew in a crash. Application of advanced technology in the Black Hawk systems makes it easier to maintain in the field than any other helicopter in the world. Black Hawk's full-squad carrying ability significantly improves the small-unit commander's ability to retain control of his forces under combat landing zone conditions, and permits more rapid replacement of ammunition and other combat consumables in a high-intensity war.

CHARACTERISTICS:

Mission Weight:	16,425 lbs
Speed:	145 knots
Endurance:	2.3 hours
Crew:	2 pilots, 1 crew chief
Armament:	Two 7.62mm machineguns
Payload:	2640 lbs or 11 combat equipped troops at 4000ft/95°F/Max Vertical Climb

NOTE: Performance characteristics at primary mission weight of 16,425 lbs.

SOVIET COUNTERPART:

The HIP series, much slower and used by the Soviets as a troop carrier and general cargo transport, can carry up to 24 troops.

FAMILY STATUS:

The Army has fielded the UH-60A Black Hawk to high-priority units in the continental United States, Europe, and Korea. The FY85 deliveries will be fielded to Panama and US Army Western Command (WESTCOM) with resumption of fielding to US Army Forces Command (FORSCOM) in the latter part of FY85. FY86 deliveries will continue to US Army Forces Command (FORSCOM), US Army Training and Doctrine Command (TRADOC), US Army Europe (USAREUR), US Army Japan (USARJ) and to Reserve and National Guard Units.

CONTRACTORS:

Sikorsky (Stratford, CT)
General Electric (W. Lynn, MA) 111



CH-47 MODERNIZATION

MIS :

The CH-47 Chinook is the Army's medium-lift helicopter. Designed in the 1950's and fielded in 1962, the CH-47's primary missions are movement of ammunition, repair parts, petroleum and tactical movement of artillery, troops, and special weapons on the battlefield. In 1975 a modernization program was approved to upgrade the CH-47A, B, and C models into a new D model configuration. These improvements extend the useful life of the fleet beyond the year 2000. They include new fiberglass rotor blades, transmission and drive system, modularized hydraulics, electrical system, advanced flight controls, triple hook cargo system, and an auxiliary power unit. These features greatly enhance reliability, maintainability, productivity, survivability, and safety of the medium-lift fleet.

CHARACTERISTICS:

Mission Weight:	50,000 lbs
Speed:	158 knots
Troops:	33
Payload:	22,703 lbs @ Sea Level, Std Day
	15,873 lbs @ 4000 ft, 95°F

SOVIET COUNTERPART:

The Soviets have one helicopter in the medium-lift category; including the upgraded "Hip". It is not considered equal in performance or efficiency to the improved Chinook.

PROGRAM STATUS:

The program is in the sixth year of production. 436 CH47 A, B, and C model aircraft will be modernized to the "D" configuration.

CONTRACTORS:

Boeing Vertol (Philadelphia, PA)
Avco Lycoming (Stratford, CT)



C-12 AIRPLANE

MISSION:

The C-12 is a low wing, twin engine, pressurized cabin, passenger and cargo carrying utility airplane. It is capable of operating under instrument flight conditions day or night, in high-density air traffic control zones and in known icing weather conditions. The C-12 contributes to the combat readiness and effectiveness of both active and reserve component units by providing priority transportation of cargo and personnel, intelligence gathering when equipped with special electronic equipment, medical evacuation and command and control in peace, mobilization, and war.

CHARACTERISTICS:

Mission Weight:	12,500 lbs
Speed:	242 knots
Ceiling:	31,000 feet
Crew:	2
Endurance:	5.5 hrs

SOVIET COUNTERPART:

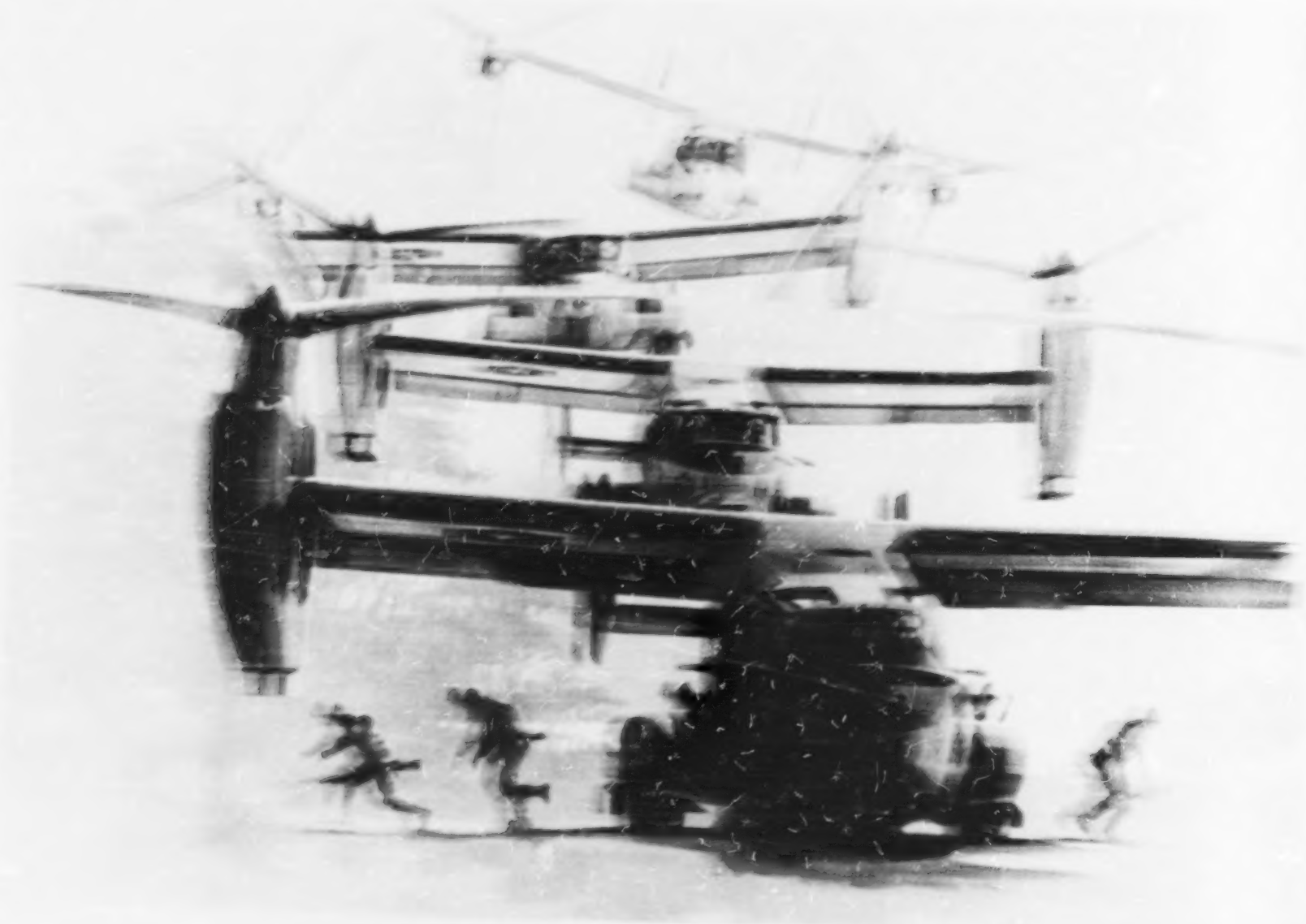
The Soviets have several small transport/utility aircraft that could be used in similar roles. These include the CASH A, the CLOD, and an older aircraft, the COLT.

PROGRAM STATUS:

There are presently 92 C-12's in the Army inventory; 80 in the active component, 12 in the National Guard. In FY 85, 12 C-12 aircraft were procured; 6 of the aircraft will be assigned to the National Guard and 6 will be placed in the active component. In FY 86, 6 C-12 aircraft will be procured.

CONTRACTOR:

Beech Aircraft Corp. (Wichita, KS)



MASSACHUSETTS TIDE GUN - (cont.)

V-22 AIRCRAFT

MISSION:

The V-22 is a multipurpose, multiservice tilt rotor aircraft which will be fielded in the Army in the early 1990's. The V-22 will perform a variety of combat, combat support, and combat service support missions in the deep, main, and rear battle areas. Typical missions will be unit repositioning, resupply, special operations and medevac.

CHARACTERISTICS:

Empty Weight:	27-29,000 lbs
Max VTOL Weight:	41-45,000 lbs
Max STOL Weight:	54-56,000 lbs
Cruise Speed	220-250 KTS
Max Speed	275-300 KTS
Range VTOL	1400 NM
Range STOL	2100 NM

SOVIET COUNTERPART:

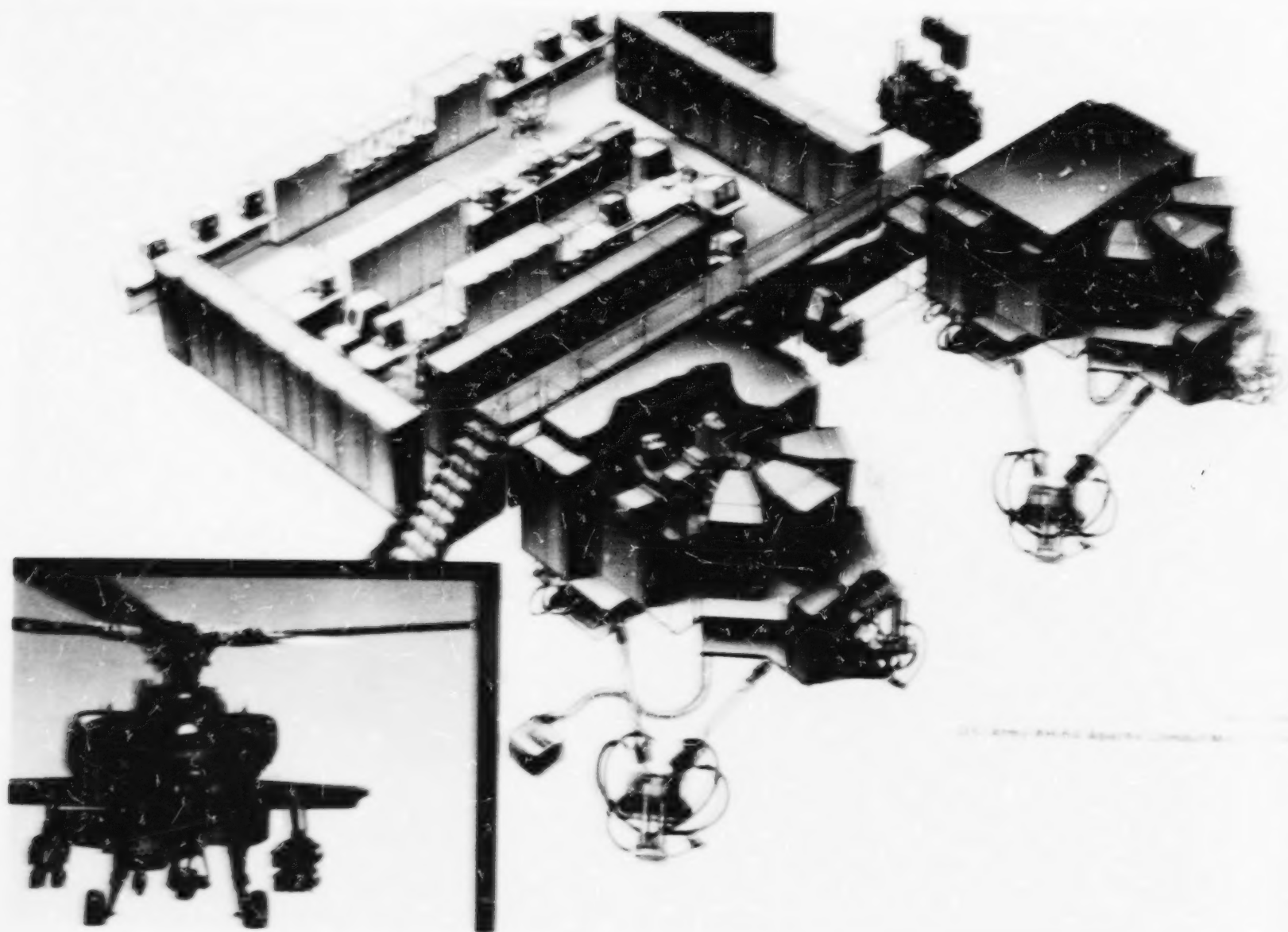
The Soviets are believed working on a tilt rotor aircraft. Deployment could take place in the early 1990's.

PROGRAM STATUS:

V-22 is currently in full scale development with an anticipated US Marine Corps initial operational capability in Fiscal Year 1991. The initial Army production of 8 aircraft will begin in FY91 with deliveries in FY93. The current Army requirement is for 231 aircraft.

CONTRACTOR (PRIME):

Bell Helicopter Textron (Ft Worth, TX.)
Boeing-Vertol (Philadelphia, PA.)



SYNTHETIC FLIGHT TRAINING SYSTEMS

MISSION:

The Army is acquiring flight simulators to improve training effectiveness, maintain combat readiness, and cope with current and future operating costs. This is being accomplished by providing high fidelity simulations of helicopter flight including nap-of-the-earth, combat environment, day/night instrument flight, and weapons engagements with enemy interaction, while at the same time, providing realistic and cost effective trainers. The Army's Synthetic Flight Training Systems (SFTS) are high fidelity, computer driven, flight weapon and mission simulators for the UH-1, CH-47, AH-1, UH-60 and AH-64 helicopters. The UH-1 simulator is an instrument flight and emergency procedures trainer mounted on a 5-degree-of-motion base. The remaining simulators are more complex devices mounted on advanced technology 6-degree-of-motion platforms, with cockpit window visual presentations for tactical, nap-of-the-earth mission training. All weapon systems in the attack helicopters are replicated for aircrew gunnery training.

SOVIET COUNTERPART:

There is no known comparable Soviet flight simulation capability.

PROGRAM STATUS:

The Army will procure 22 UH-1, 6 CH-47, 16 UH-60, 9 AH-1, and 7 AH-64 flight simulators: All UH-1 simulators, 4 CH-47, 3 AH-1 Simulators, and the prototype UH-60 have been fielded. In FY85, the Army fielded 3 additional AH-1 Simulators and the prototype AH-64 Combat mission Simulator (CMS). Production models of the combat Mission simulator will be fielded beginning FY86; UH-60 Simulators will start fielding in mid-1987; the final two CH-47D Flight Simulators will be fielded in FY86.

CONTRACTOR:

Link Division, Singer Co. (Binghamton, NY)



HIGH MOBILITY MULTIPURPOSE WHEELED VEHICLE (HMMW)

MISSION:

The HMMW program provides a successor to the M274 (1/2-ton MULES), all 1-1/4-ton trucks (GAMA GOATS) and selected M151 Jeeps (1/4-ton). HMMW's will be used in the airborne, airmobile, and light infantry division as the weapons carrier for the TOW missile and will also fill roles as reconnaissance, fire support, communication, personnel transport and command and control vehicles and ambulances in various other Army units. This high mobility 4x4 vehicle is diesel powered, and uses a common chassis with various body configurations to meet the above requirements. This Tri-Service program also provides vehicles to satisfy Marine Corps and Air Force requirements. The HMMW is a complementary program to the nondevelopmental Commercial Utility and Cargo Vehicle (CUCV).

SOVIET COUNTERPART:

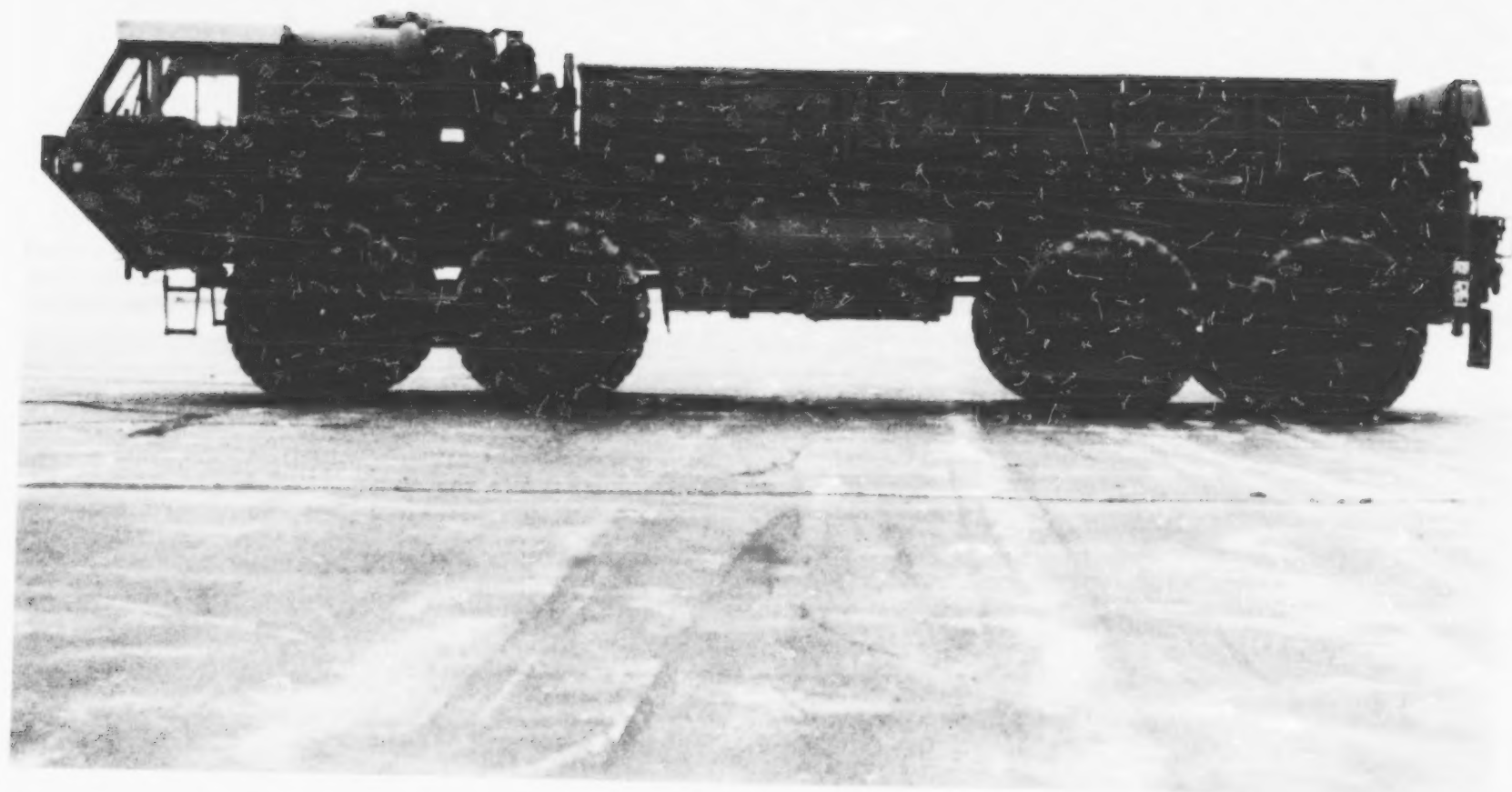
No known Soviet counterpart.

PROGRAM STATUS:

In 1983 a 5-year multiyear contract was awarded for a basic quantity of 54,973 vehicles (all services) with an option to increase production by 100%.

CONTRACTOR:

AM General Corp.



HEAVY EXPANDED MOBILITY TACTICAL TRUCK (HEMTT)

MISSION:

The HEMTT program provides a 10-ton, 8-wheel drive, tactical truck with tandem front and rear axle. This highly mobile vehicle comes in five body styles: cargo, tractor (2 body styles), wrecker, and fuel tanker. The 10-ton HEMTT is an assemblage of commercial components and meets high priority ammunition and fuel transport needs and requirements for the force modernization systems such as Multiple Launch Rocket System (MLRS), Patriot, M1 Abrams tank and AH-64 Attack Helicopter.

SOVIET COUNTERPART:

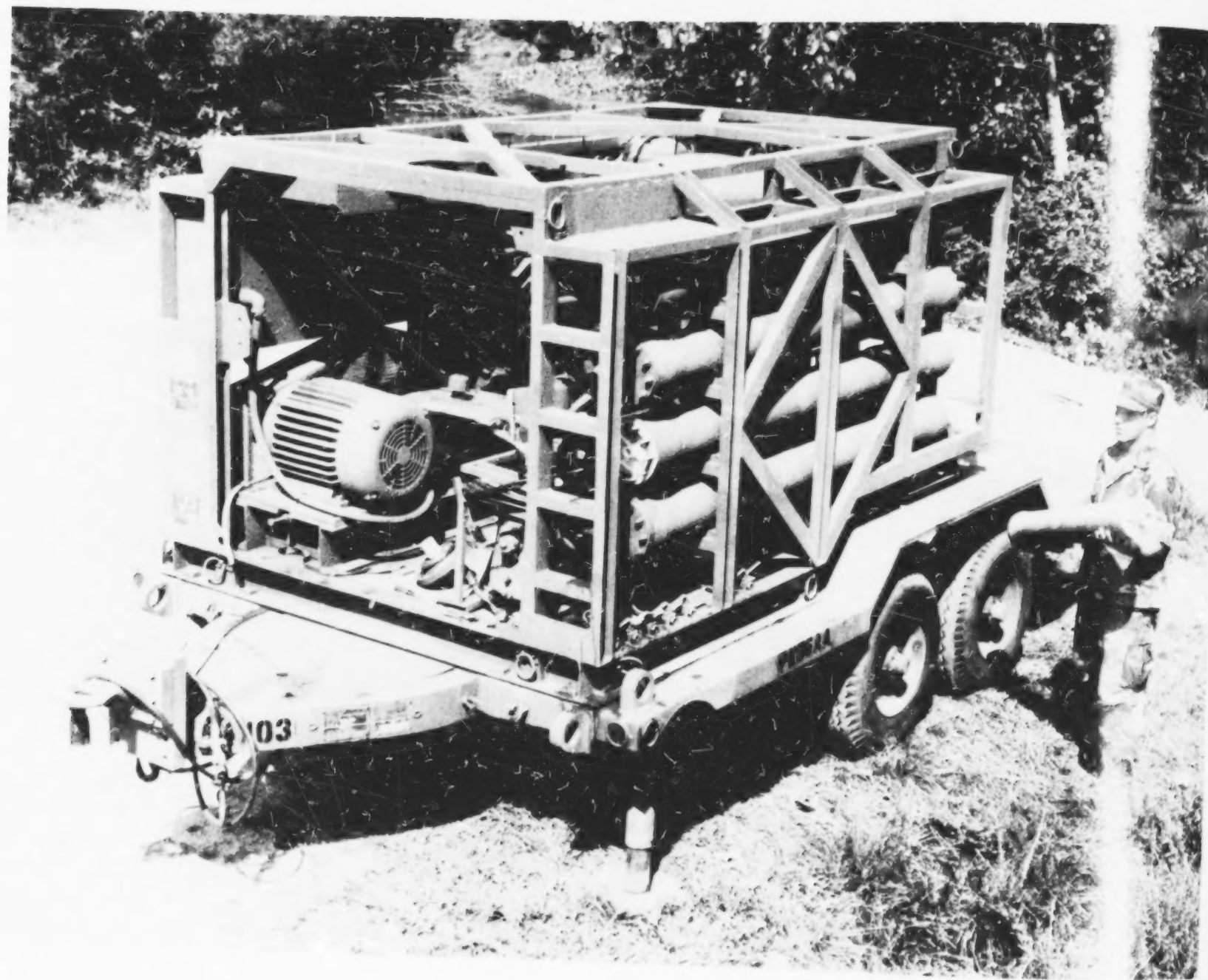
The closest counterpart is the ZIL-135, an 8 to 10 ton, 8x8 drive truck powered by 2 gasoline engines.

PROGRAM STATUS:

On May 22, 1981, a 5-year multiyear contract was awarded for a basic quantity of 2,140 vehicles with an option to increase production by 250%.

CONTRACTOR:

Oshkosh Truck Corp.



REVERSE OSMOSIS WATER PURIFICATION UNIT (ROWPU) 600 GALLONS PER HOUR (GPH)

M ISSION:

The 600 GPH Reverse Osmosis Water Purification Unit (ROWPU) provides fresh drinking water in harsh and arid environments. The ROWPU purifies fresh, saline, brackish, and nuclear, biological, and chemical (NBC) contaminated water.

C HACTERISTICS:

The 600 GPH ROWPU represents the latest state-of-the-art technology in water purification. The treatment process consists of high rate filtration through a mixed media filter with direct application of polymer, filtration through a 5-micron cartridge filter, followed by filtration through the reverse osmosis system. This equipment was designed to operate 20 hours a day at a production rate equivalent to 600 gallons per hour of fresh water and 400 gallons per hour on sea water. The size of the unit is 250 units x 96 inches x 100 inches and includes a 30 Kw generator. The weight of the trailer mounted unit is 16,950 pounds. The unit can be towed behind a 5-ton truck and can be sling-lifted for transport by helicopter. The unit operates in temperatures ranging between -25° and 110° Fahrenheit. The ROWPU replaces the erdlator which can purify only fresh water.

SOVIET COUNTERPART:

The Soviets currently utilize two pieces of equipment to accomplish the task for which the United States has developed the ROWPU. To purify fresh water and NBC contaminated water, the Soviets currently use the MAFS-3, a unit similar to the erdlator. To purify brackish or saline water, the Soviets utilize distillation process equipment, called the OPS, incorporated in the current standard desalinization equipment.

PROGRAM STATUS:

The 600 GPH ROWPU has been fielded and acquisition of additional machines is planned.

CONTRACTOR:

UNIVOX Inc. (Los Angeles, CA)
Mechanical Equipment Co. (New Orleans, LA)

The Tactical Command, Control and Communications (C3) mission area includes resources for providing effective command and control, automation, and communications support to combat units. In order for a commander to effectively control his tactical elements, he must know where they are located and must have a means by which to talk to them even in an enemy electronic countermeasure environment. The systems included in this mission area provide that capability. Without them, the Army would be as helpless as a person without a nervous system.

COMMAND, CONTROL, AND COMMUNICATIONS (C³)



POSITION LOCATION REPORTING SYSTEM (PLRS)

MISSION:

PLRS is a joint Army/Marine Corps development to automatically provide combat commanders with accurate location data on deployed forces, and to provide reliable navigation information and a limited data communication capability to equipped friendly units or personnel. PLRS consists of a master station at the division command post, an alternate master station at division artillery, and up to 370 lightweight user units in manpack, vehicle, and aircraft configuration distributed throughout division (or separate brigade) maneuver and fire support elements. User units automatically transmit location data to the master station, where it is displayed in realtime. This enables visual command and control of forces over a large area in a manner never before possible. Through the data communication capability of PLRS, users can send short preformatted or free-form messages between themselves and/or the master station to obtain automatic location and navigation information on themselves or other users. This feature significantly relieves the existing FM voice nets of the division commonly used for such purposes. The system is crypto-secure and highly resistant to jamming.

SOVIET COUNTERPART:

None known.

PROGRAM STATUS:

PLRS entered full scale production in 1983. Deployment to one Army division is scheduled for 1987. Further deployment of PLRS will occur through fielding of the Army Data Distribution System (ADDS).

CONTRACTOR:

Hughes Aircraft Company, Ground Systems Group (Fullerton, CA)

ENHANCED PLRS USER UNIT

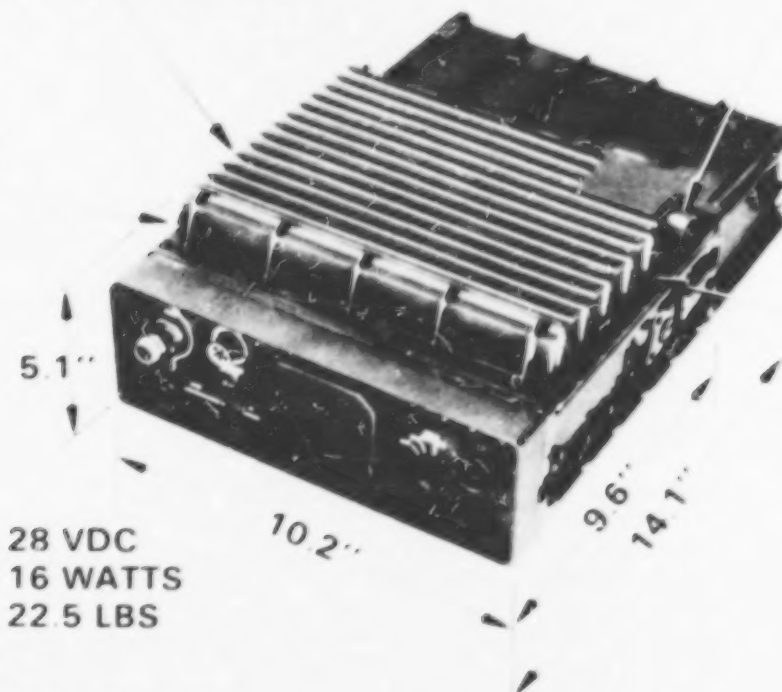
USER-TO-USER
COMMUNICATIONS

INCREASED
DATA RATE

SUPPORTS
DUAL-LEVEL
SECURITY

STANDARD
INTERFACE

PRIME POWER 28 VDC
16 WATTS
WEIGHT 22.5 LBS
(INCLUDES BATTERIES
AND BATTERY BOX)
VOLUME 660 CU IN



ARMY DATA DISTRIBUTION SYSTEM (ADDS)
POSITION LOCATION REPORTING SYSTEM (PLRS)/
JOINT TACTICAL INFORMATION DISTRIBUTION SYSTEM (JTIDS) HYBRID
(PLRS/JTIDS) (PJH)

MISSION:

The Army Data Distribution System (ADDS), also called the PLRS/JTIDS Hybrid (PJH), will modify, combine, and integrate components of PLRS and JTIDS in an evolutionary five-phase program to take advantage of the advanced state of development of these two projects. The PJH system will support Army near real-time data distribution requirements in the Division and Corps area. The PJH contains three primary equipment elements: Enhanced PLRS User Units (EPUU), JTIDS terminals, and Net Control Stations (NCS). The EPUU are assigned to almost all units in the Division area that participate in data communications, identification and position location/navigation. JTIDS terminals will be assigned to those users whose data throughput requirements cannot be satisfied by the EPUU and who participate heavily in interservice communications. For example, air defense users pass high volume tracking data internally and exchange friendly identification information with the Air Force. The NCS provides overall system network management. The PJH system will support data communications requirements in the five functional areas of fire support, air defense, intelligence/electronic warfare, maneuver control and combat service support.

SOVIET COUNTERPART:

None known.

PROGRAM STATUS:

ADDS entered its final phase of development in 1985 with deployment scheduled for 1988.

CONTRACTORS:

Hughes Aircraft Company, Ground Systems Group (Fullerton, CA)
The Singer Company, Kearfott Division (Little Falls, NJ)



JOINT TACTICAL COMMUNICATIONS (TRI-TAC) PROGRAM

The Joint Tactical Communications (TRI-TAC) Program is a joint service and DOD Agency program to develop and field advanced tactical multichannel switched communications equipment. This equipment will provide the combat forces with the tactical communications needed to meet the mobility, security and reliability requirements of the modern battlefield. This program was established to achieve interoperability between service tactical communications systems, interoperability with strategic communications systems, take advantage of recent advances in technology, and eliminate duplication in service developments. Each component of the program is assigned to one of the services to develop and acquire for all of the defense community. The two major components assigned to Army are the AN/TTC-39 family of switches, the AN/TYC-39 Message Switch and Mobile Subscriber Equipment (described in the writeup on the following page).

AN/TTC-39 CIRCUIT SWITCH AND AN/TYC-39 MESSAGE SWITCH

MISSION:

This equipment provides automatic switching service, interconnecting analog and digital users, between tactical and Defense Communication System switches, and between US and NATO national switches. Both switches employ micro-electronic components and design techniques to minimize size, weight, and power consumption. The AN/TTC-39 system is the heart of the multichannel switched network and is a highly efficient means of connecting telephones, message traffic, and data users in both a secure and nonsecure mode in the area network at echelons above Corps.

SOVIET COUNTERPART:

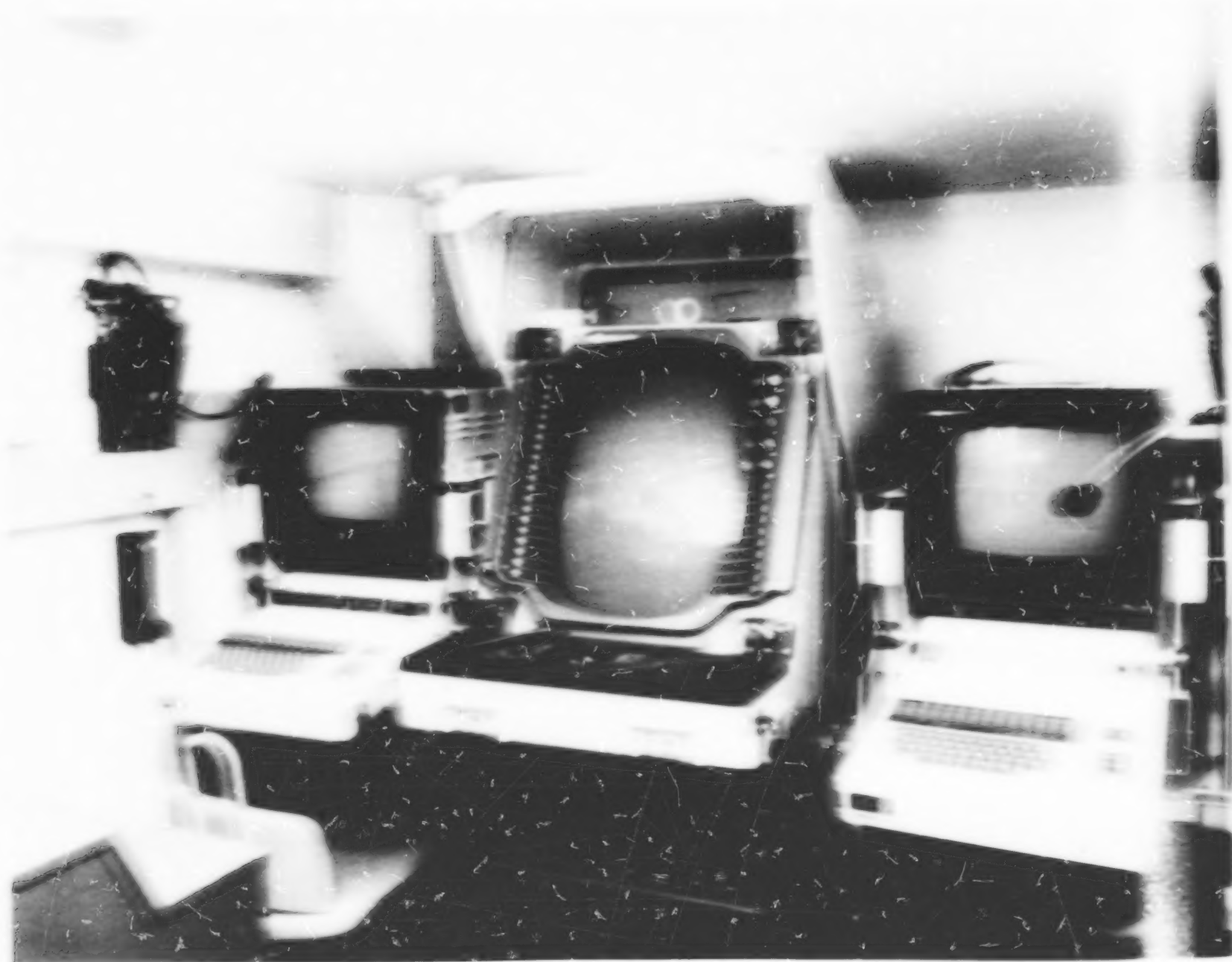
There is no known counterpart.

PROGRAM STATUS:

Both switches were authorized for production in FY80. Fielding of these switches was accomplished in FY85.

CONTRACTOR:

GTE Sylvania (Needham Heights, MA)



MOBILE SUBSCRIBER EQUIPMENT

MISSION:

MSE is an area communications system which will be fielded in the Corps and division areas. MSE provides secure static and mobile (on the move) voice/data/facsimile service to principal commanders and key staff officers enabling them to exercise command and control over their forces in the rapidly changing battlefield environment. (Approximate commercial equivalent is telephone system with mobile radiotelephone service and data capability.) The Corps network consists of 5 divisions which are composed of approximately 50 nodes and will provide service to 1900 mobile and 10,000 static subscribers. MSE is interoperable with TRI-TAC, combat net radios, commercial telephone, and NATO systems. It allows users to keep the same telephone number as they move on battlefield and will automatically route calls around damaged or jammed nodes. Since market surveys determined that MSE-type systems were already available, the Army opted to use non-developmental item (NDI) acquisition strategy, i.e., to accept the best available system as opposed to developing the "ultimate" system to save time, money, and personnel.

SOVIET COUNTERPART:

There is no known Soviet counterpart.

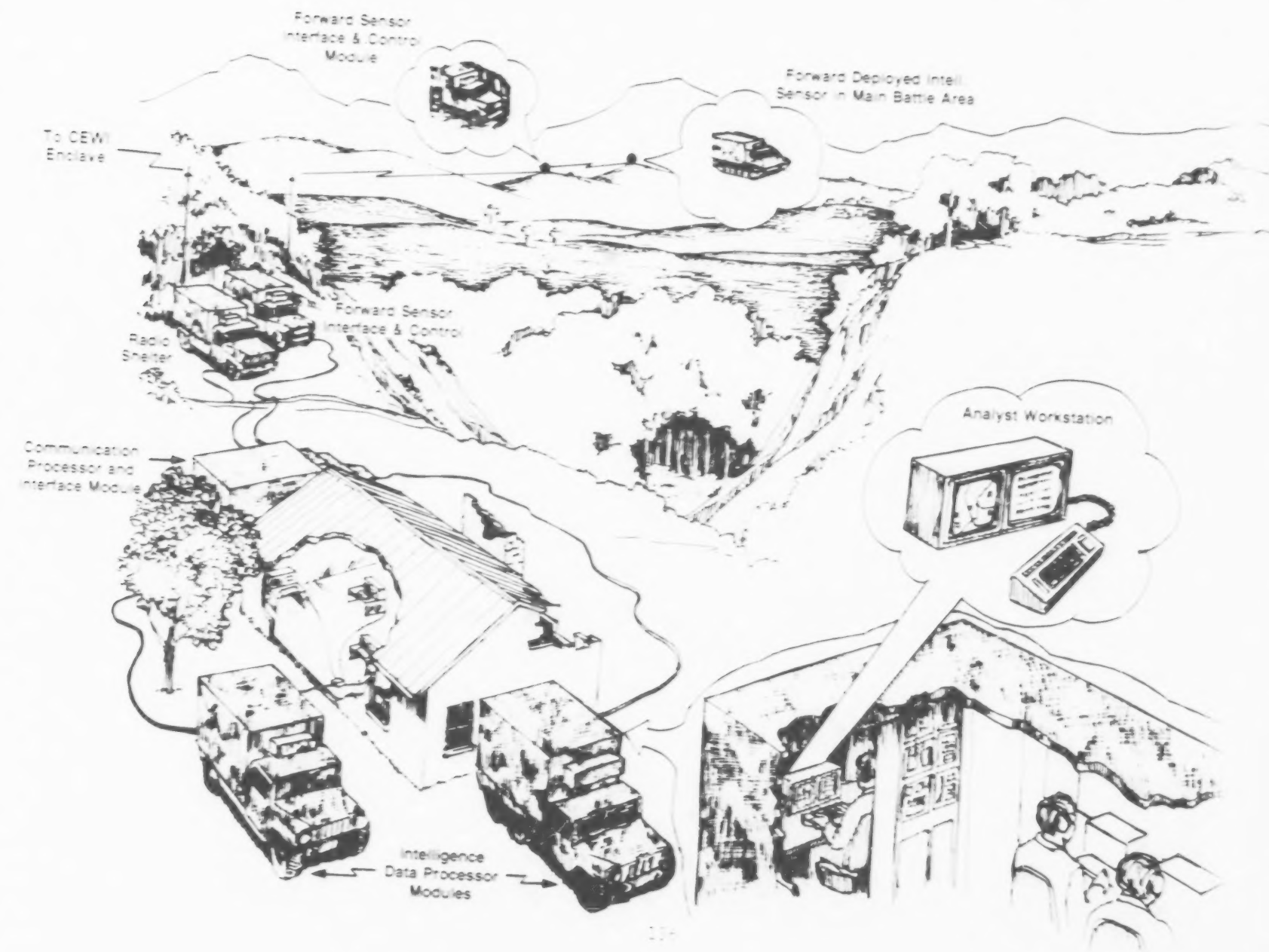
PROGRAM STATUS:

The Army plans to award a production contract in January 1986.

CONTRACTOR:

GTE selected by competitive process.

ALL SOURCE ANALYSIS SYSTEM



ALL SOURCE ANALYSIS SYSTEM (ASAS)

MISSION:

The All Source Analysis System will be the control system for the Intelligence/Electronic Warfare (IEW) subsystem of the Army Command and Control System. Many sophisticated sensor systems have already been fielded, yet today the capability to process this information and distribute timely intelligence products to the battle managers is limited by manual and partially automated methods now employed. The ASAS will provide modern minicomputer systems to speed the process and enhance its accuracy and effectiveness. The ASAS is being developed together with the Air Force Enemy Situation Correlation Element (ENSCE) under the Joint Tactical Fusion Program. The acquisition strategy will provide initial components of baseline systems in the mid-1980s. The systems will evolve via pre-planned product improvements and software refinement based on feedback from field users. The ASAS/ENSCE system architecture is modular. Division ASAS, Corps ASAS, and ENSCE systems can be configured differently as force structure and mission requirements dictate. Emphasis is on small, rapidly deployable products, providing basic functionality.

SOVIET COUNTERPART:

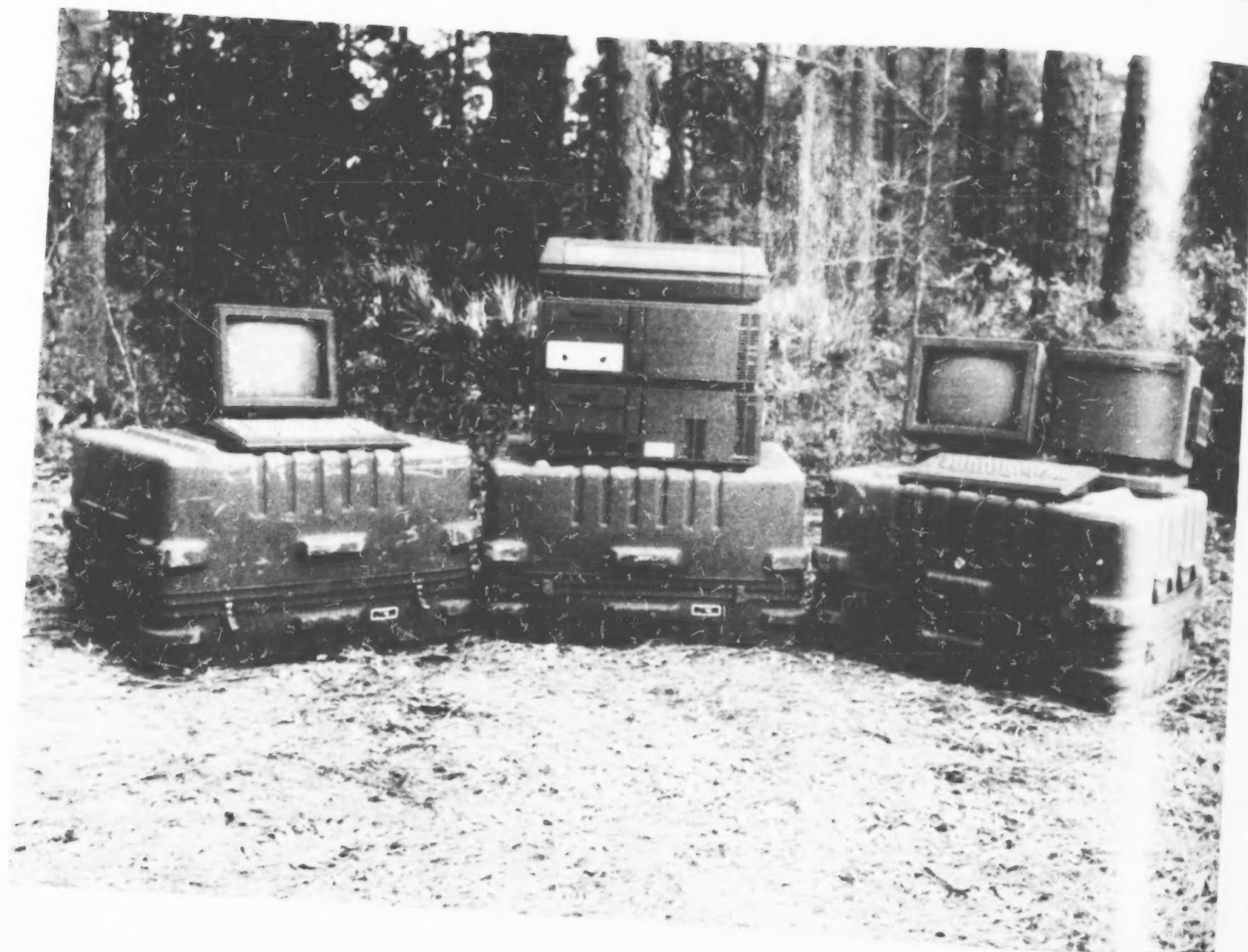
No known Soviet counterpart.

PROGRAM STATUS:

Design began in FY84. Development of the system modules began in FY85. Testing of system modules will begin in FY86. Fielding to the force will commence in the late 1980s.

CONTRACTORS:

Jet Propulsion Laboratory (Prime Contractor) (Pasadena, CA)
Martin Marietta Corporation (Data Processing Modules, System Integration and Support) (Denver, CO)
Ford Aerospace and Communications Corporation (Communications Modules) (Palo Alto, CA)
HRB Singer (Applications Software) (College Park, PA)
TRW (Applications Software) (Redondo Beach, CA)
McDonnell Douglas (Applications Software) (Huntington Beach, CA)



TACTICAL ARMY COMBAT SERVICE SUPPORT COMPUTER SYSTEM (TACCS)

MISSION:

The Tactical Army Combat Service Support Computer System (TACCS) is a transportable, commercially available, off-the-shelf computer system which has been ruggedized for use on the battlefield for missions at various levels of command down to the battalion. These missions include personnel, supply, maintenance, medical, ammunition, and transportation. The system will utilize commercially available software to support requirements of word processing, sort/merge, electronic spread sheet, and programming. Its prime function is data entry, inquiry and retrieval, editing, printing, and data transmission to higher level systems. TACCS will execute standard, centrally-designed application software in the respective mission areas.

CHARACTERISTICS:

Mission Gross Weight (3 Cases):	130 lbs per case
Dimensions:	3 cases each less than 36 in x 36 in x 30 in.
Mean Time to Repair:	60 minutes
Random Access Memory (RAM):	16 bit, 768 KB (kilobytes)
Mass Storage:	67 MB (megabytes)

SOVIET COUNTERPART:

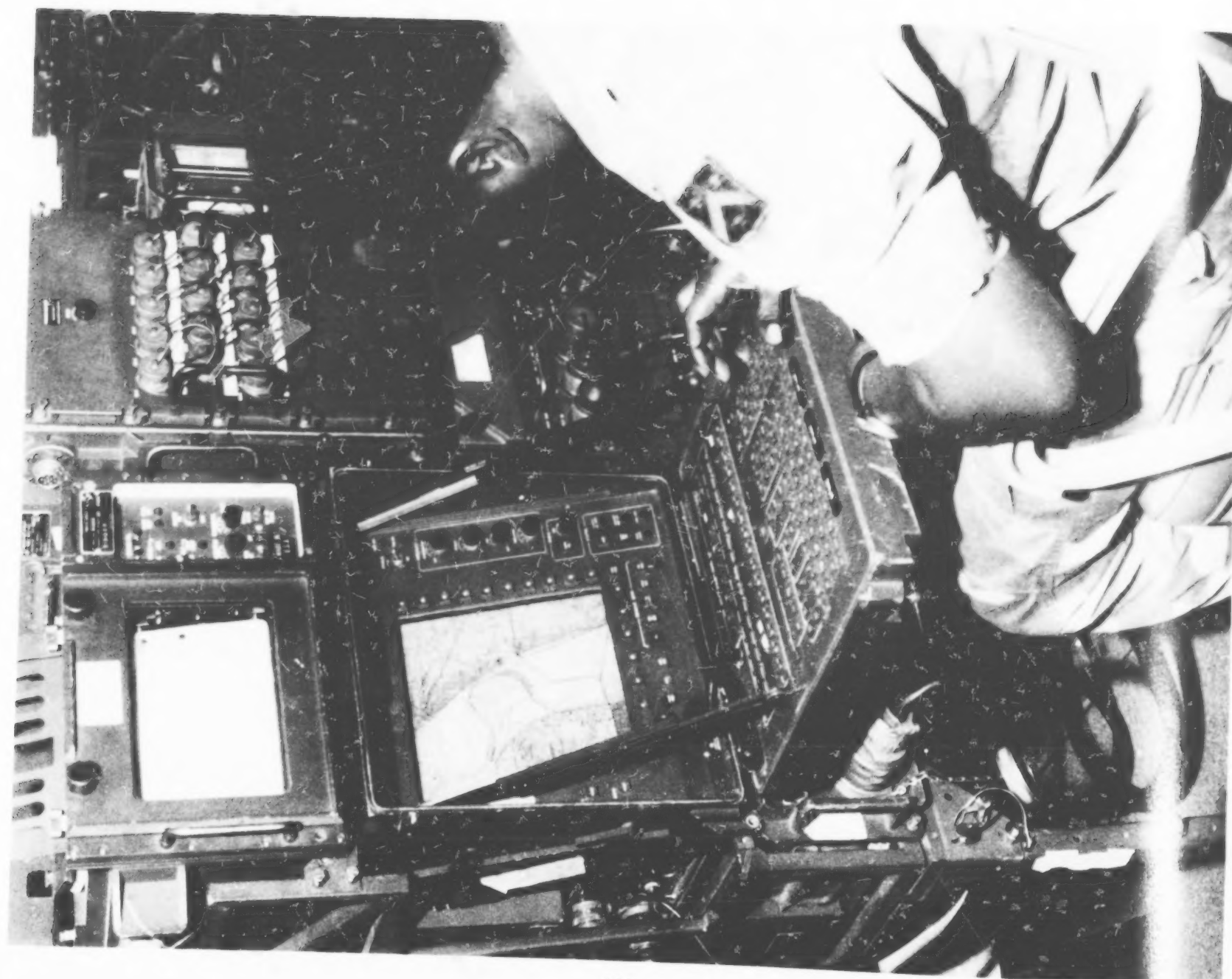
No known Soviet counterpart.

PROGRAM STATUS:

The Initial Operating Capability planned for 3rd Quarter, FY85 was achieved. 450 TACCS Systems were fielded by December 1985 from a Limited Procurement Contract awarded in FY84 with Burroughs. A multi-year production contract spanning four years with an additional option of five-one year contracts will be awarded in 2nd Quarter of FY86.

CONTRACTOR:

Burroughs (Paoli, PA)



MANEUVER CONTROL SYSTEM (MCS)

MISSION:

The Maneuver Control System (MCS) is an automated command and control system that provides computer-aided decision support to tactical commanders and their battle staffs at corps through battalion levels. The 1990-2010 battlefield envisioned by the AirLand Battle Doctrine will be fluid, continuous, and conducted in all sectors ranging from friendly rear-area to enemy rear-area. The Army's Command and Control System (ACCS) architecture has the objective of providing the necessary command and control resources for the Force Commanders at all echelons up to Corps to win on that battlefield. The MCS is the objective maneuver and Force level control system in ACCS. A prototype capability was fielded in Europe (VII Corps) in 1981 as a means of obtaining user feedback and requirements refinement to support the system's evolution. In 1983, the MCS completed development and operational testing and was approved for production. This decision included direction to initiate an integrated Nondevelopment Item (NDI) effort to complement the fully militarized MCS devices.

PROGRAM STATUS:

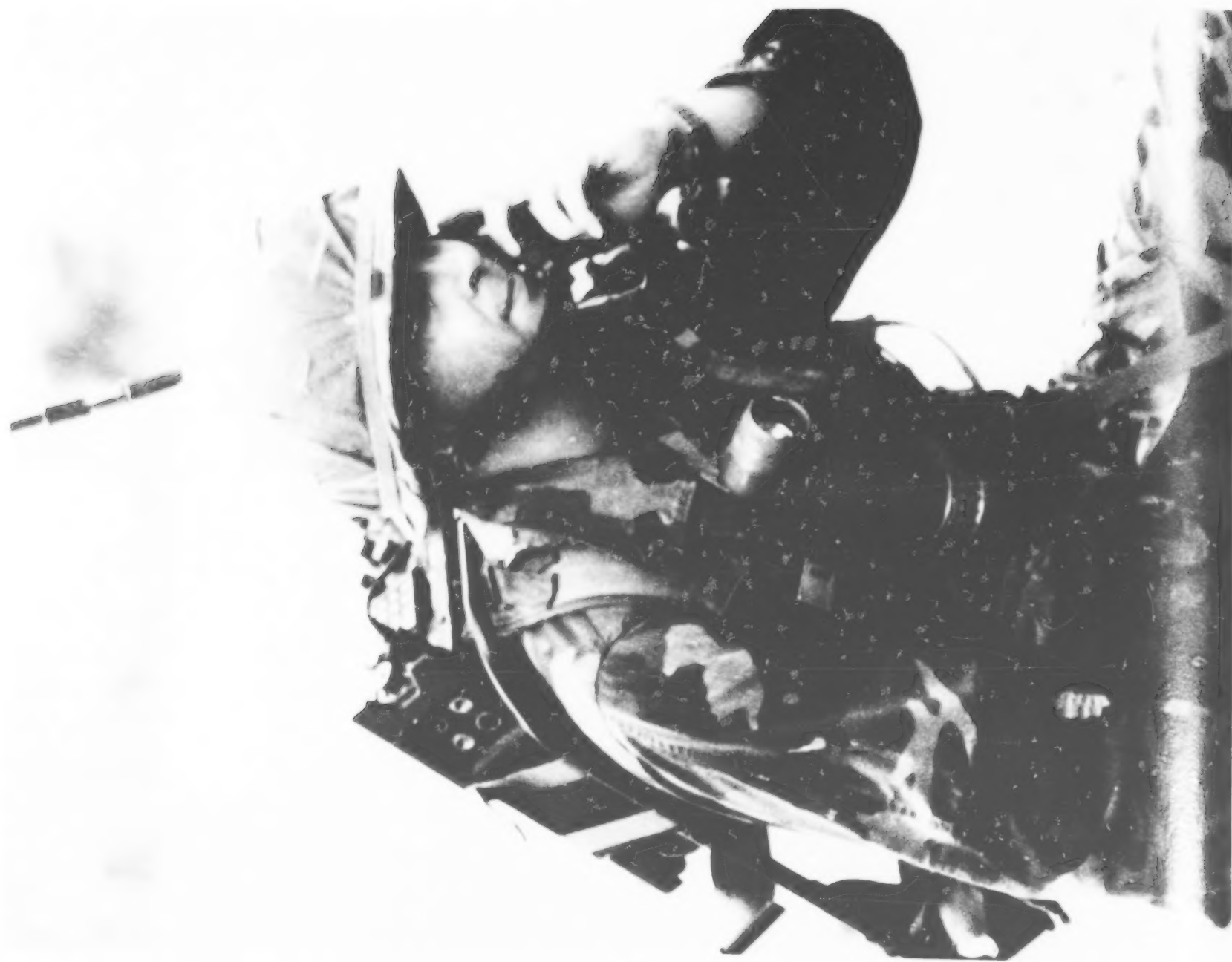
FY86 will mark the fourth year of Ful-mil MCS hardware production with initial fielding scheduled for 1986. The NDI hardware contract will be awarded in FY86 for the Tactical Computer Processor (TCP).

SOVIET COUNTERPART:

There is no known comparable Soviet system.

CONTRACTORS:

Singer Librascope (Glendale, CA)
Ford Aero Space & Communications Corp. (Colorado Springs, CO)



SINGLE CHANNEL GROUND AND AIRBORNE RADIO SYSTEM (SINCGARS-V)

MISSION:

The SINCGARS-V program will provide the next generation of VHF-FM combat net radios to be fielded for the US Forces starting in 1986. This family of radios will be lightweight, securable, capable of providing both voice and data transmission and possess electronic counter-countermeasures (ECCM) features (frequency hopping). The radio configurations (manpack, vehicular, and airborne) are being developed based on maximum commonality of components and reduction in logistic support requirements.

CHARACTERISTICS:

Weight:	22.5 lbs w/battery and COMSEC Device
Frequency Range:	30.00 to 87.975 MHz
Channels:	2320
Channel Spacing:	25 kHz
Range:	8-35 km

SOVIET COUNTERPART:

The Soviets have no known counterpart.

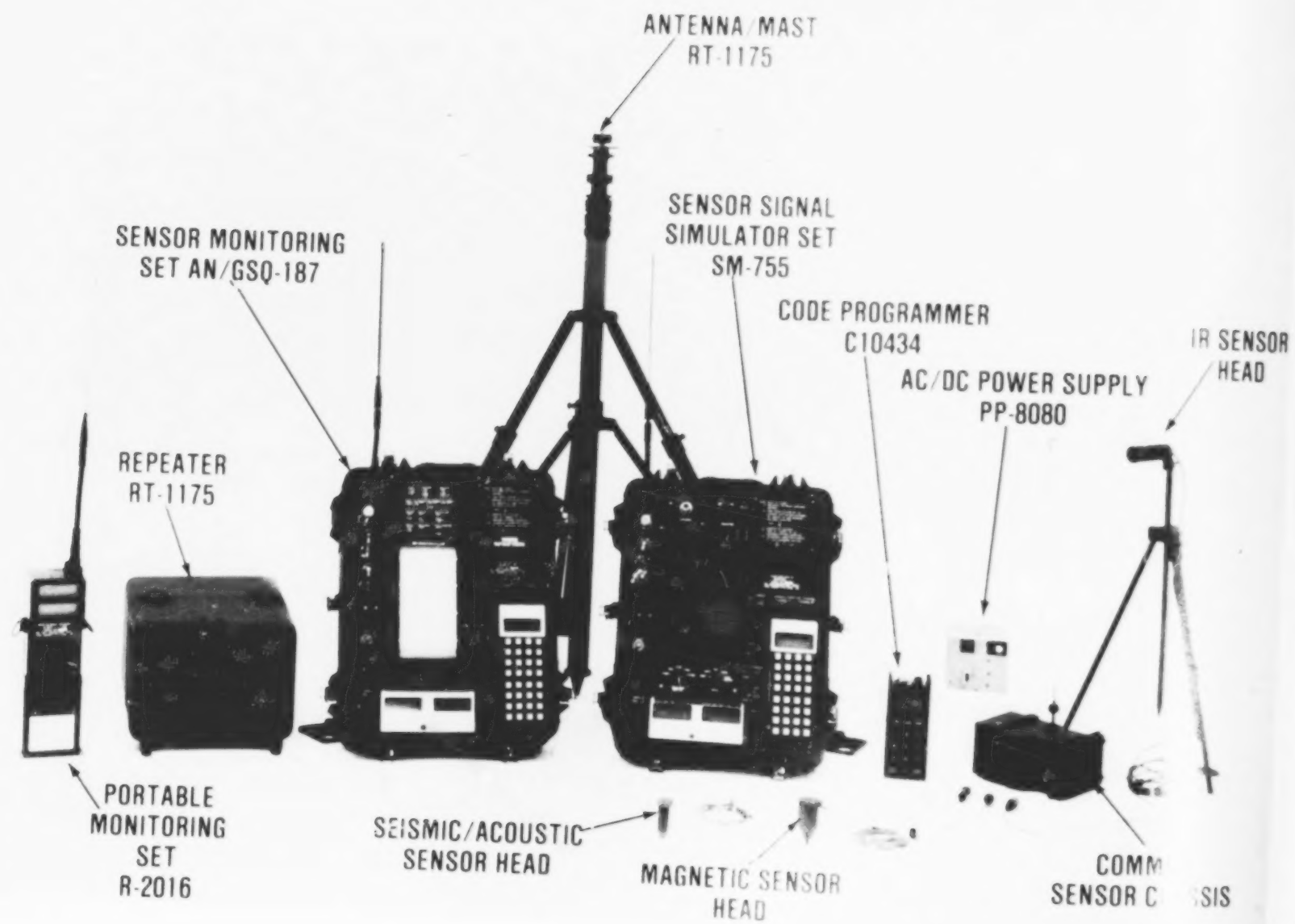
PROGRAM STATUS:

SINCGARS-V has been type classified standard. The first production contract with options for a total of 44,600 radios was awarded in December 1983.

CONTRACTORS:

ITT Aerospace/Optical Division (Fort Wayne, IN)

REMBASS



REMOTELY MONITORED BATTLEFIELD SENSOR SYSTEM (REMBASS)

MISSION:

REMBASS is a system of seismic, acoustic, magnetic, and infrared (IR) sensors that are presently hand emplaced and remotely monitored. The sensors both classify and detect movement of personnel and wheeled and track vehicles. Reported information is automatically provided to the supported unit's operations center to assist in fire and maneuver decisions. REMBASS's burst transmission technique, below-ground sensor emplacement and passivity of operation make REMBASS extremely hard to detect. It provides the tactical commander with an urgently needed all-weather, terrain independent system for forward area operations, and a rear area intrusion detection and target development capability. REMBASS is a light, easily deployed and maintained system that is well suited for contingency force operations faced with wide frontages, extensive depths, and gaps between adjacent forces. With the use of relays/repeaters for ground application, REMBASS is designed to provide targeting data at the 100 km range. It thus partially fills the "see deep" requirement of the AirLand Battle. Various combat scenarios for REMBASS have been proposed including its use as a cueing device for elevated radar platforms, remotely piloted (drone) vehicles, and ground surveillance radar systems.

SOVIET COUNTERPART:

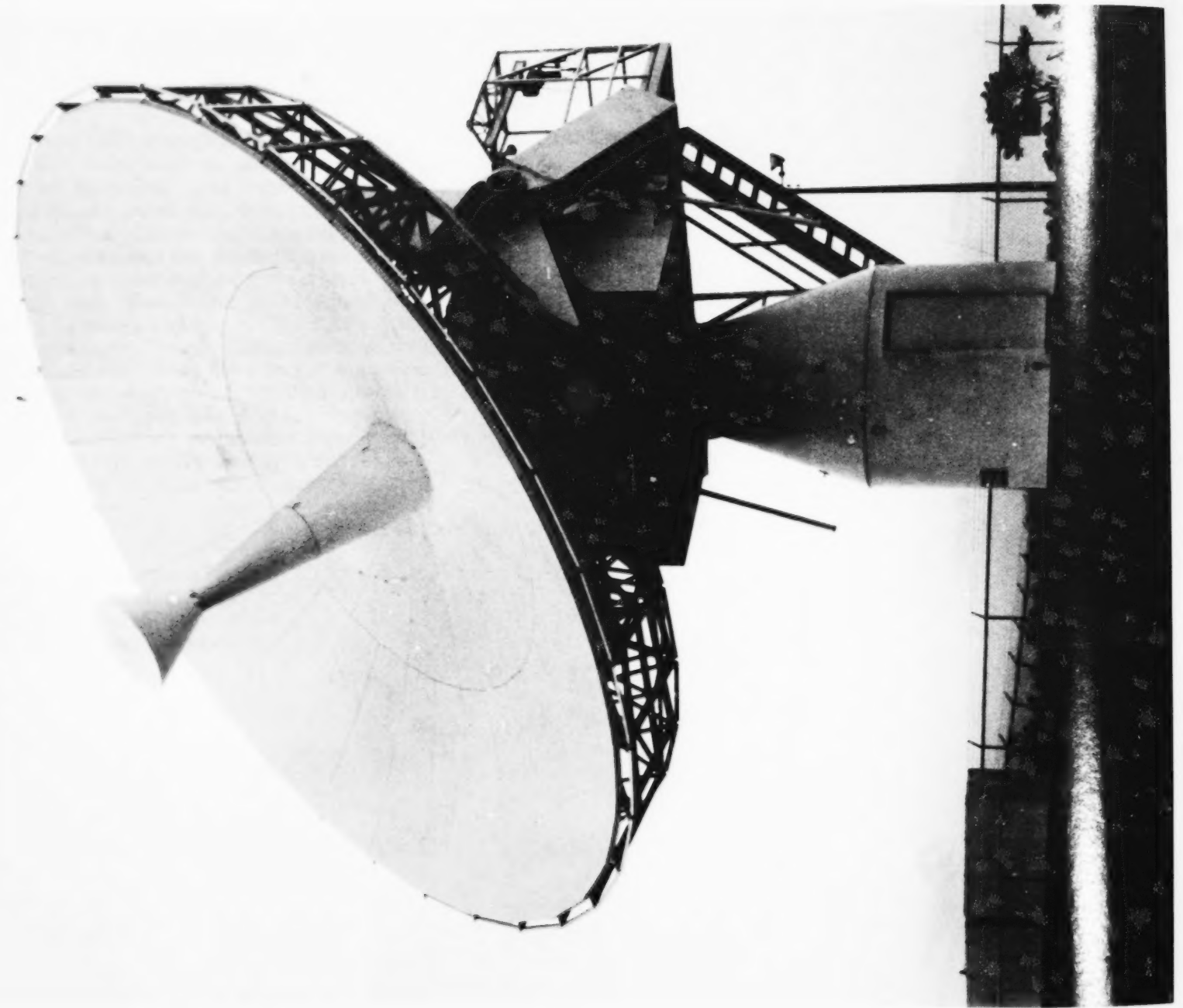
There is no known comparable Soviet equipment.

PROGRAM STATUS:

The development phase of the program ended in FY83. REMBASS entered Full Scale Production in FY85. Initial Operational Capability is projected for the 2nd quarter of FY87. An RDTE effort began in FY85 for an Improved REMBASS System incorporating the latest hardware technology to further reduce size and weight and enhance deployment options.

CONTRACTOR:

RCA (Camden, NJ)



DEFENSE SATELLITE COMMUNICATIONS
SYSTEM (DSCS) - GROUND ENVIRONMENT

MISSION:

The DSCS provides unique and vital communications for the Department of Defense and other U.S. Government agencies. As its share of the DSCS program, the Army develops, procures, and fields ground satellite communications earth terminals and control systems for all the armed services. These terminals and control systems support rapid, reliable, effective worldwide command, control, communications and intelligence operations of military commanders, and the National Command Authority. Developments are underway to maximize traffic rates, increase effective use of scarce satellite resources, provide cost effective system control, and minimize vulnerability to enemy countermeasures.

SOVIET COUNTERPART:

The Soviet Union possesses a large strategic satellite network, based upon use of the MOLNIYA and STATSIONAR satellites.

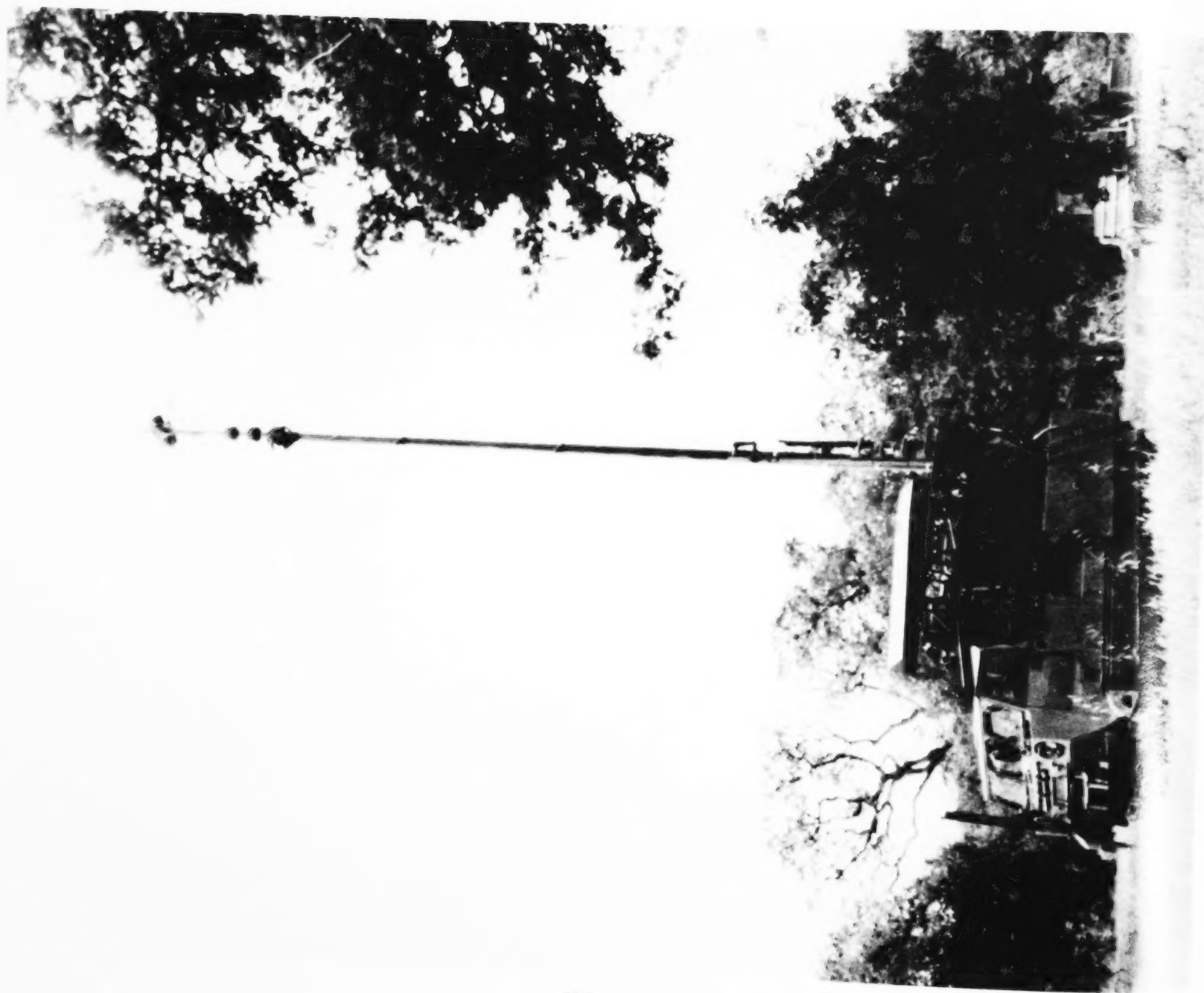
PROGRAM STATUS:

Approximately thirty ongoing contracts support R&D and procurement to field a variety of satellite ground terminals and requisite control systems.

CONTRACTORS:

Comtech Laboratories (Smithtown, NY)
Harris Corp. (Melbourne, FL)
Ford Aerospace Corp. (Palo Alto, CA)
GE Corp. (Valley Forge, PA)
Magnavox (Torrence, CA)
California Microwave (Sunnyvale, CA)

RCA Corp (Camden, NJ)
M/A-Comm Linkabit Corp
(San Diego, CA)
Raytheon (Sudbury, MA)
Martin Marietta (Orlando, FL)



TRAILBLAZER

MISSION:

TRAILBLAZER is a ground based, highly mobile tactical communications intercept and radio direction finding system. This heavy division asset in its objective configuration consists of five master control stations configured in KEVLAR shelters netted by secure data link and voice command and control communications. The shelters are mounted on the M1015 tracked vehicle which is a modified M548 and a member of the M113 family of vehicles. Significant modifications to the basic vehicle include the installation of a 60KW, 400Hz power subsystem, an electronically operated ground rod driver, an intercommunication system, and a trailer towing capability. This all weather system is designed to operate in a dense electronic signal environment, providing the tactical commander with accurate and timely information on enemy locations, order of battle and plans.

CHARACTERISTICS:

Operator Positions:	2
Vehicle Range:	200 miles
Weight:	10,000 lbs
Antenna Mast:	Quick erect pneumatic
Set Up/Tear Down Time:	20 minutes

SOVIET COUNTERPART:

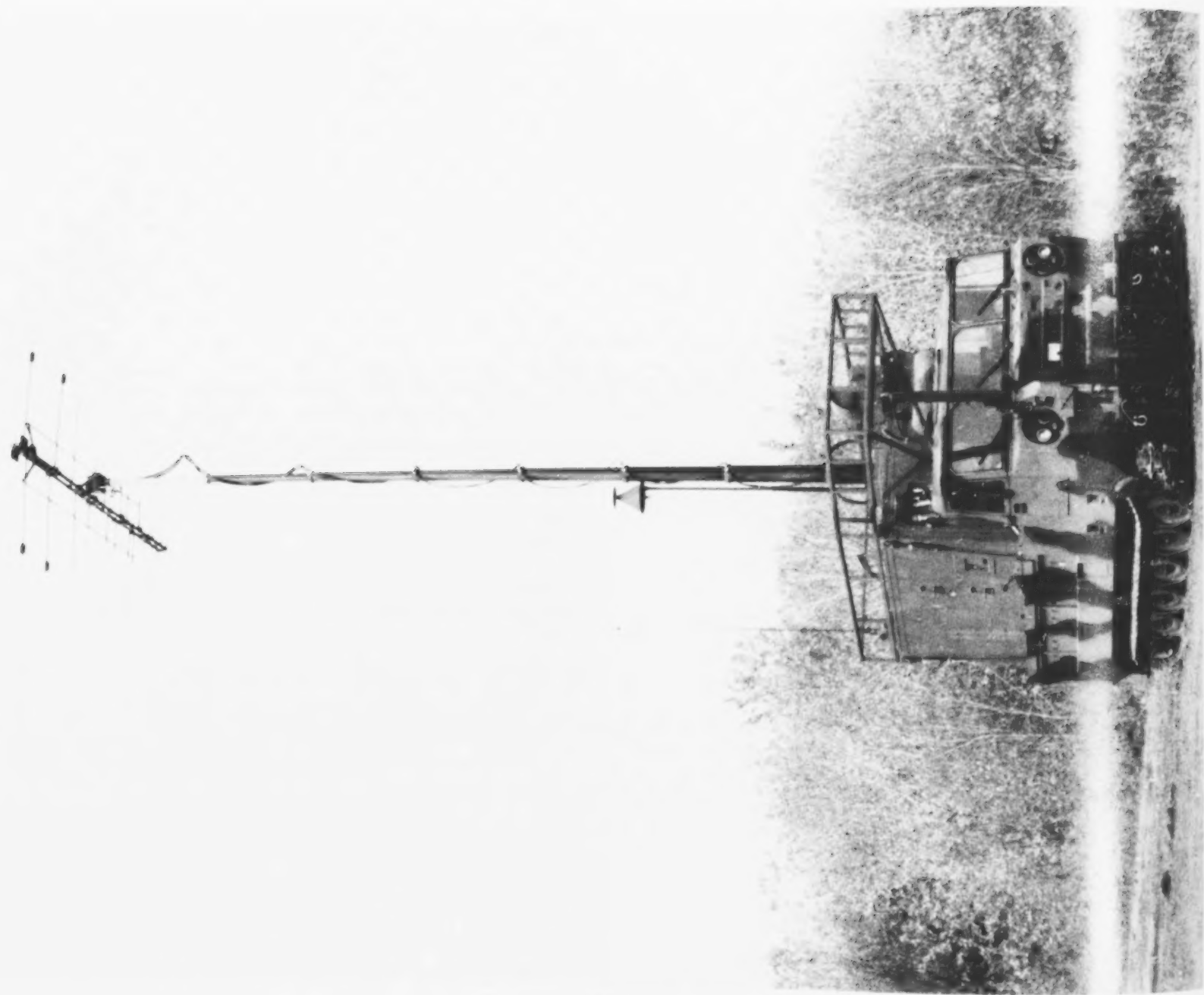
There is no known Soviet system comparable to TRAILBLAZER, however, the Soviets are known to have a variety of air and ground systems which perform similar functions.

PROGRAM STATUS:

TRAILBLAZER is in production with deliveries scheduled through FY89.

CONTRACTORS:

Electromagnetic Systems Laboratories, Inc., Sunnyvale, CA



TACJAM

MISSION:

TACJAM is a ground based, highly mobile tactical communications jamming system. The system is configured in a KEVLAR shelter mounted on the M1015 tracked vehicle. The M1015 is a modified M548 and a member of the M113 family of vehicles. Significant modifications to the basic vehicle include the installation of 60KW, 400Hz power subsystem, and a ground rod driver. The TACJAM System in its objective configuration will have a secure data link and voice command and control communications to the Technical Control and Analysis Center. The system uses a quick erect pneumatic antenna mast and a folding log periodic antenna.

CHARACTERISTICS:

Number of Operators	1
Frequency Range	VHF
Shelter	S-595
Antenna Mast	Quick Erect Pneumatic
Weight	10,000 lbs

SOVIET COUNTERPART:

R-330A Communication Jammer.

PROGRAM STATUS:

TACJAM is in production with deliveries scheduled through 1989.

CONTRACTORS:

GTE Systems (Mt View, CA.)
American Electronic Laboratories (Lansdale, PA.)

The Soldier Support mission area includes those items that directly support the individual soldier. This mission area includes organizational clothing and individual equipment, chemical-biological defense equipment, night vision devices and individual weapons (further described on the pages following). As we modernize the Army with new equipment, we must keep the individual soldier equally up-to-date.

SOLDIER SUPPORT



ARMOR VEST/HELMET



MICROCLIMATE
COOLING SYSTEM



HELMET COMPATIBLE
COMMUNICATIONS/AURAL
PROTECTIVE SYSTEM



M16A2 RIFLE



NIGHT VISION GOGGLES



XM 40
PROTECTIVE MASK



COMBAT BOOTS



COLD WEATHER
CLOTHING SYSTEM

**SOLDIER SUPPORT
ITEMS**

SOLDIER SUPPORT

OBJECTIVES AND CHARACTERISTICS:

ORGANIZATIONAL CLOTHING AND INDIVIDUAL EQUIPMENT (OCIE). Items in development are designed to provide improved protection capabilities to counter newly emerging battlefield threats. The latest technological advances in material and equipment designs are utilized to significantly increase the soldier's combat efficiency and effectiveness, to assure survivability, supportability, and sustainability under diverse geographical and extreme climatological battlefield conditions. The Army's primary developer for OCIE is Natick Research and Development Center, Natick, Massachusetts.

CHEMICAL-BIOLOGICAL DEFENSE (CBD) EQUIPMENT is being developed to permit the soldier to survive and continue his mission with minimal performance degradation on the chemical-biological contaminated battlefield. CBD development includes items for improved eye and respiratory protection and personal and individual equipment decontamination. The Chemical Research and Development Center, Aberdeen Proving Grounds, Maryland is the Army's primary developer of CBD equipment.

NIGHT VISION DEVICES allow the individual soldier to function as well during night operations as during the day. These devices enable the soldier to locate, identify, and engage targets during period of darkness and reduced visibility (haze, fog, and smoke). Future technology will focus on miniaturizing and reducing weight of the device, while lowering life cycle costs. The objective is to make devices available to more soldiers, while insuring that the sights are effective and convenient to use. Night vision development is conducted at the Night Vision and Electro-Optics Laboratory at Fort Belvoir, Virginia.

INDIVIDUAL WEAPONS. The M16A2 (5.56mm) rifle is the standard rifle for the individual soldier. Performance is enhanced by improvements made to the M16A1 including different rifling to enable the NATO standard 5.56mm round to be fired. The M16A2 will serve as the standard rifle until adoption of the Advance Combat Rifle (ACR) around the year 2000. The ACR is currently in the technology development phase at the Armament Research and Development Command, Dover, New Jersey. It is expected that the ACR will provide significant improvement in performance over the M16A2. The aged .45 cal pistol is to be replaced by a 9mm handgun which will have the capability to fire NATO standard 9mm ammunition. The 9mm handgun will be more accurate, more reliable and more effective due to dual action firing mechanisms and ambidextrous safeties.

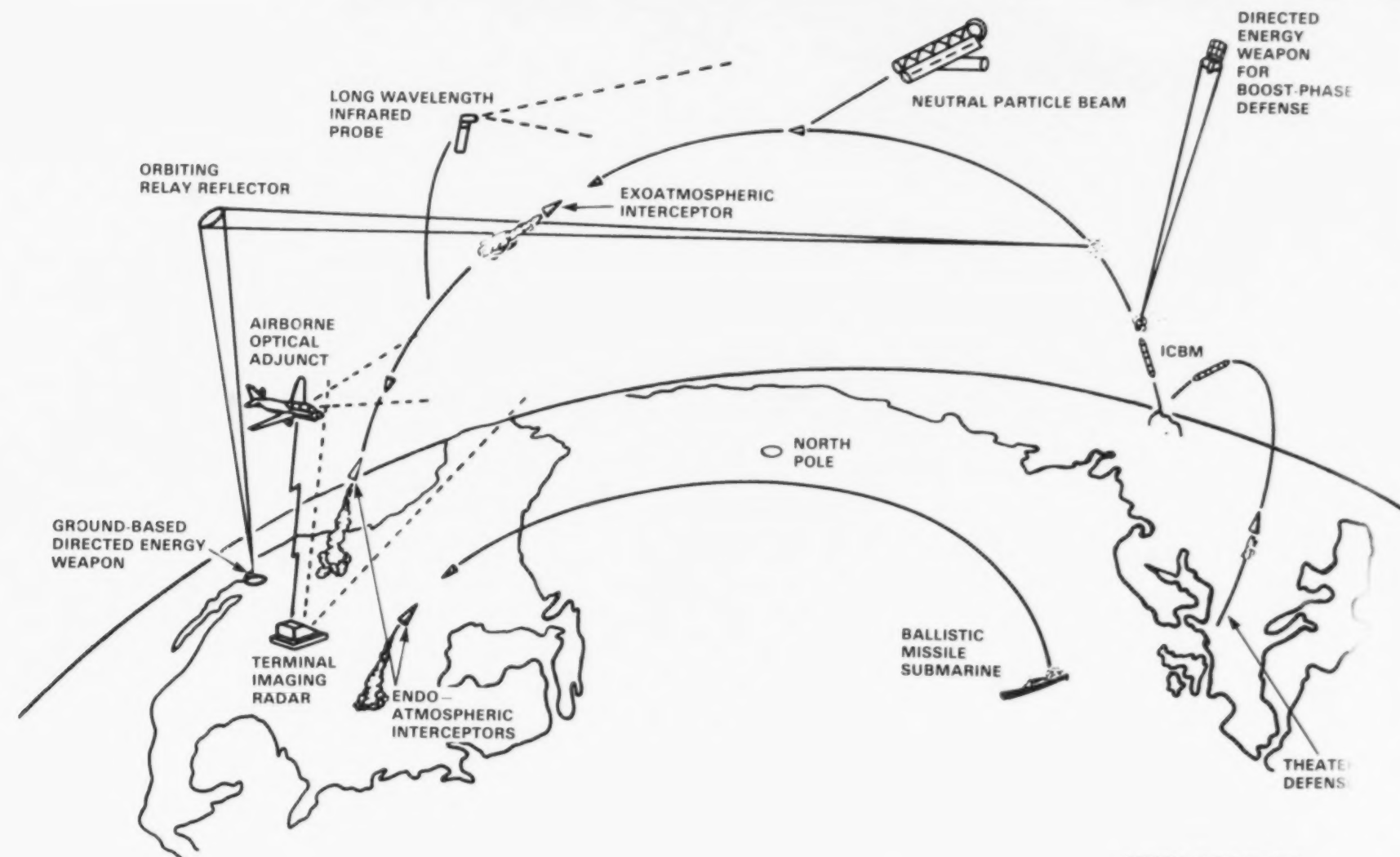
PROGRAM STATUS:

This is a continuing program which responds to the requirements and state-of-the-art changes necessary to enable the soldier to fight and survive on the battlefield.

The Strategic Conflict mission area relates to inter-continental or transoceanic inter-theater conflict. The US Army Strategic Defense program is the Army's only strategic weapons development program.

STRATEGIC CONFLICT

CONCEPTUAL STRATEGIC DEFENSE SCHEMA



UNCLASSIFIED

US ARMY STRATEGIC DEFENSE COMMAND

MISSION:

The US Army Strategic Defense Command (USASDC) conducts the Army's only strategic weapons research and development program and is a major contributor to the Department of Defense Strategic Defense Initiative (SDI). The mission of the US Army Strategic Defense Command is to conduct a coordinated research program, in accordance with Defense, SDI, and Army guidance, which ensures a timely energetic and cost effective development of mature and revolutionary technologies for defense against ballistic missiles. Explicitly included in the mission are tasks to coordinate all Army Anti-Tactical Ballistic Missile (ATBM) techbase development to maximize benefits for Strategic Defense and Anti-Tactical Missile programs; to manage the Kwajalein Missile Range as a National Range; and to ensure that all efforts are in compliance with applicable international treaties and Presidential and National Security Directives.

The US Army Strategic Defense Command managed a FY86 research program in excess of \$800 million in the five functional areas of ballistic missile defense: Surveillance, Acquisition, Tracking and Sill Assessment; Kinetic Energy Weapons; Directed Energy Weapons; Systems Analysis/Battle Management and; Survivability, Lethality, and Key Technology. This research is necessary to demonstrate technologies leading to a multitiered strategic defense systems.

PROGRAM STATUS:

The FY87 program will build upon developed technologies through focused investigations in the areas of surveillance and sensor components, directed energy weapons, kinetic energy weapons, and battle management/command, control and communication with potential application to ground and space-related strategic defensive systems. This work offers the Army an opportunity to make major contributions to strategic defense through application of its unique knowledge in these areas. This research effort will facilitate integration of the ballistic missile defense technology programs into the Army's long range plans.

SOVIET COUNTERPART:

The Soviets are maintaining and upgrading an operational BMD System around Moscow in addition to conducting very active BMD basic R&D and system development programs.

CONTRACTORS (LARGEST):

Boeing Aerospace Co. (Seattle, WA)
Lockheed Missiles and Space Co. (Sunnyvale, CA)
McDonnell Douglas Astronautics Co. (Huntington Beach, CA)

